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TEXAS STATE JOURNAL OF MEDICINE

Volume 46 Number 12 Austin, Texas, December, 1950

CONTENTS

	Page
PRESIDENT'S PAGE	Preceding 867
EDITORIALS	
A.M.A. Dues Explained	867
The Fight Against Tuberculosis	869
Military Medical Procurement Situation	869
Current Editorial Comment	
Influenza or Acute Respiratory Disease?	870
ORIGINAL ARTICLES	
Malignancy of the Lungs—	
I. Value of Bronchoscopy *George S. McReynolds*	872
II. Pathology *Paul Brindley*	874
III. Place of Anesthesiology *H. C. Slocum and C. R. Allen*	875
IV. Role of Thoracic Surgery *A. W. Harrison*	877
Tuberculosis Surveys in Texas: Experiences in San Antonio *Howard E. Smith*	881
Mediastinal Masses Discovered by Mass Photofluorography *William S. Brumage*	883
Primary Carcinoma of the Lung in Texas *R. H. Rigdon and Paul Brindley*	885
Idiopathic Spontaneous Pneumothorax: An Etiologic Consideration *Robert A. Wise*	889
Subphrenic Abscess *W. M. Palm*	894
Roentgen Diagnosis of Diaphragmatic and Adjacent Lesions *L. R. Sante*	902
Variations of the Normal Skull *R. W. Burford*	910
CASE REPORTS	
Brain Abscess due to Nocardia Asteroides: Report of a Case *Kleberg Eckhardt and John Pilcher*	915
NEWS	
Coming Meetings and Clinics	919
Increases in Federal Income Tax	921
Texas Neuropsychiatric Association	921
International Post-Graduate Medical Assembly of Southwest Texas	921
Urological Association to Meet in Dallas	922
Texas Fellows of College of Surgeons	922
LIBRARY SECTION	
Package Service	924
Motion Picture Film Library	924
Book Notices	925
ORGANIZATION SECTION	
State Medical Association	
Public and Professional Relations Committees Named	927
Local Committees for Annual Session	927
Executive Council to Meet	928
County Societies	928
District Societies	929
AUXILIARY SECTION	
Auxiliary News	929
DEATHS	931
VOLUME INDEX	v
ADVERTISERS INDEX	2

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ADVERTISERS' INDEX

	Page
Abbott Laboratories	29
Ayerst, McKenna & Harrison	57
Balyeat Hay Fever & Asthma Clinic	2
Beverly Hills Sanitarium	33
Birtcher Corporation	56
Brown's School	24
Buie Clinic & Marlin Sanitarium Bath House	33
Burroughs Wellcome & Co.	63
Camp, S. H. & Co.	30
Canada Dry Ginger Ale, Inc.	22
Carman Sanatorium, Inc.	19
Chicago Medical Society	20
Continental Casualty Co.	60
Cook County Graduate School of Medicine	10
Dallas. Med. & Surgical Clinic and Hospital	54
Doctors Secretarial Service	24
Eli Lilly & Co.	(Insert)
First Texas Chemical Mfg. Co.	12
Fleet, C. B. & Co.	55
General Electric X-Ray Corp.	9
Gilbert X-Ray Company of Texas	18
Grace Lutheran Sanatorium	16
Group Hospital Service	28
Hanger, J. E., Inc.	4
Hoye's Sanitarium	54
International Post-Graduate Med. Assembly of SW Texas	26 & 27
Julius Schmid, Inc.	51
King's Daughters Clinic and Hospital	66
Krueger, Hutchinson & Overton Clinic	58
Lauer Metal Co.	62
Lederle Laboratories	17
Majors, J. A. & Co.	1
Martin X-Ray and Radium Clinic	10
Mead Johnson & Co.	32
Medical Protective Co.	24
Merck & Co., Inc.	61
Miller Brace Co.	16
Murray Agency	58
Oak Ridge Sanitarium	54
New Orleans Graduate Medical Assembly	62
Parke, Davis & Co.	64 & 65
Pearson School, The	24
Pfizer, Chas. & Co., Inc.	52 & 53
Physicians Casualty Assn.	10
Physicians' Directory	34-39
Producers Creamery Co.	14
Quincy X-Ray & Radium Laboratories	62
Ralph Sanitarium	4
San Angelo Medical & Surgical Clinic	58
Schering Corp.	13
Scott & White Hospital	66
Searle, G. D. & Co.	31
Sharp & Dohme	21
Squibb, E. R. & Sons	6 & 7
Taberlock Laboratories	11
Terrell Supply Co.	20
Terrell's Laboratory	3
Texas Society of Pathologists	5
Timberlawn Sanitarium	59
Torbett Clinic & Hospital	59
Travis Clinic & Nan Travis Memorial Hospital	58
Trowbridge Training School	19
Turner's Clinic & X-Ray Laboratories	10
United States Brewers Foundation	14
U. S. Vitamin Corporation	(Insert)
Upjohn Co.	15
Walker Vitamin Products	22
Wander Co.	8
Want Ads	50
West Texas Maternity Hospital	24
Western Clinic-Hospital	19
Wheatland Retreat	19
Wichita Falls Clinic Hospital	16
Winthrop-Stearns	23
Woooward Medical Personnel Bureau	56
Wyeth, Inc.	25

President's Page

PUBLIC AND PROFESSIONAL RELATIONS COMMITTEES

Elsewhere in this issue of the JOURNAL, our Association is announcing the organization of Public and Professional Relations Committees which will operate in the fifteen councilor districts covering the entire state. This project is approved by the House of Delegates.

Similar committees are now operating in thirty-nine states and the remaining commonwealths are in process of completing their organizational work.

Purpose of these committees is to compose any misunderstandings between the public and the medical profession, and the operations of these groups constitute another expression of the physicians' constant concern for the welfare of their patients.

In forming these committees, the Board of Trustees chose three physicians from each of the fifteen districts to serve terms of one, two, and three years.

In my opinion, establishment of these committees—sometimes called "grievance" committees—is one of the most progressive steps which our Association could take. Certainly, any patient who questions services rendered, who feels he has been overcharged, or who is dissatisfied for other reasons, is entitled to appeal to the county medical society in his area. To avoid bias or prejudice, complaints will be considered by committee members who do not reside in the same city as the physician complained against.

The committees consider the complaints, discuss them with the physician concerned, and recommend a reasonable solution. Experience has proved that in practically all cases, solutions are reached amicably, as most complaints originate from lack of understanding.

In cases involving fees, misunderstandings usually arise because both physician and patient have failed to discuss this important item before the obligations are incurred. This is a difficult thing to do. Ordinarily, few people contract for other services or make purchases without a definite understanding of the prices to be charged. In many

instances, patients do not understand that a simple bill "For Services Rendered" often covers laboratory tests, x-ray examinations, and other items. When these matters are explained, misunderstanding usually evaporates.

In cases where committees have found that the doctor was in error, little difficulty has been experienced in settling the complaint. Rarely has any action by a society been necessary.

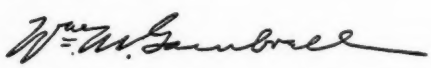
As has been said, today, the problem is not simply one of disciplining members, but is one of improving relations with the public, of clarifying misunderstandings, of adjusting differences so that individual physicians and the profession itself may continue in the confidence of the American people.

We have talked with many doctors throughout Texas and in other states, and almost without exception, all are enthusiastic over this new program which can do so much to create good will for the medical profession.

The success of the plan in Texas will be measured exactly by the cooperation which is received from all our physicians and the personnel of our committees. We cannot overemphasize the importance of this project. Experience has proved that when the operation of these committees is announced publicly, a large number of complaints is likely. We would be less than human if we did not enjoy telling our troubles to someone. But experience has also shown conclusively that after the first rush of complaints, when the public knows it has a source of relief from real or fancied grievances, the number of complaints quickly dwindles.

In the interest of constantly improving our public relations, I join members of our House of Delegates, our Trustees, and our Councilors and committeemen in asking your wholehearted and warm support of this splendid program.

As the year is drawing to a close, Mrs. Gambrell and I wish to take this opportunity to thank each doctor and doctor's wife for your patient understanding and wholehearted cooperation. With the fondest love in our heart for each of you, we say, "Merry, merry Christmas, and a happy and prosperous New Year to all."



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A.M.A. DUES EXPLAINED

The first year in which the American Medical Association has required its regular members to pay dues has created widespread confusion in the minds of physicians. Some have failed to understand the new provisions voted by the A.M.A. House of Delegates last December; some have become entangled, through no fault of their own, in the as yet imperfect collection and acknowledgment procedure.

For years, members of county and state medical societies had been automatically members of the American Medical Association and had received all the benefits of such membership without payment of national dues. If they wished to participate in the work of the scientific sections or to become eligible to be delegates in the House of Delegates or officers of the A.M.A., they could apply for fellowship, the dues of which recently had been $12 per year and which covered a subscription to *The Journal of the A.M.A.* (Merely subscribing to *The Journal,* although representing the same outlay of funds, did not mean that the subscriber was a fellow.)

Recognizing that the many scientific, educational, and professional activities of the American Medical Association could not be continued without definite, regular income, the House of Delegates voted to levy annual dues of $25 per regular membership in the organization beginning with the calendar year January 1, 1950. The only exceptions were to be those physicians for whom payment would be a distinct financial hardship and whose county and state medical society dues were waived. An additional exception was created for physicians who were not members of a county or state society prior to July 1, 1950, and whose A.M.A. membership dues for the remainder of the year were set at $12.50. The fellowship category was retained for 1950 without charge, the $12 for fellowship being required in addition to the $25 for membership.

It has been decided that beginning with 1951, regular membership dues of $25 per annum will include subscription to *The Journal of the A.M.A.* Fellowship dues will be decreased to $5, and fellows may elect to receive any one of the specialty publications issued by the A.M.A. instead of *The Journal* if they prefer.

Physicians called into active military service will have their A.M.A. membership dues remitted to the nearest half-year in which they enter service. A.M.A. officials have announced that the $25 dues for 1951 will not be accepted from physicians who allowed their membership for 1950 to lapse for nonpayment of regular dues of $25.

In setting up the procedure for payment of dues, the American Medical Association stated that all membership dues of $25 were to be channeled through the state medical society of which the dues-paying physician was a member. In this way, a check could be made on the eligibility of the physicians to become a member of the A.M.A. and the state society could keep tab on the status of its members. Fellowship dues of $12 for 1950 and $5 for 1951 have been and should be sent directly from the physician to the A.M.A.

Recently a letter was sent to all members of the State Medical Association of Texas whose A.M.A. membership dues of $25 for 1950 had not been paid through the state office. It is apparent from some of the replies that in the period immediately following the establishment of membership dues, the A.M.A. accepted some $25 payments directly from physicians without notifying the state office of such payments. It is only human, of course, that some mistakes would creep into the new bookkeeping procedure involving scores of thousands of persons. The A.M.A. staff and the State Medical Association staff will gladly correct any discrepancies called to their attention.

Recent efforts to collect American Medical Association membership dues have been prompted by two desires: (1) a desire to be sure that each member of the State Medical Association of Texas understands that payment of regular dues of $25 for the year 1950 is required for him to remain a member in good standing of the A.M.A. and that a certain procedure for paying such dues has been established, and (2) a desire to be positive that each physician who has failed thus far to send in his regular A.M.A. dues of $25 for 1950 is relinquishing his membership with full realization of what he is giving up.

Many physicians who have held membership in the American Medical Association for years have taken it for granted and have never taken time to discover the benefits to which their membership entitles them. The A.M.A. operates scientific laboratories to test the efficacy of pharmaceutical and nutritional preparations and therapeutic machines. It collects books, periodicals, reprints, and motion pictures for loan to physicians who may not have ready access to medical libraries. It studies legislation and makes economic surveys for the profession. It publishes a variety of technical periodicals for persons trained and employed in medical fields and offers factual health material in language and format attractive to the general public. In addition to these and a host of other specific contributions, the American Medical Association serves as a clearing house for scientific, legislative, economic, and professional matters in which physicians are or should be interested and acts as spokesman for physicians when a nationally united front is indicated.

In the recent general elections, political observers gave physicians as individuals credit for exercising noticeable influence in the defeat of a number of Administration wheel horses who had led the fight for compulsory health insurance in the Senate and House. Partly as a result of the National Education Campaign carried on by the American Medical Association, voters became better acquainted with the conditions to be expected under a system of socialized medicine and registered their convictions at the polls.

The year 1950 is about to end and with it the opportunity to be counted as a member of the American Medical Association for purposes of representation in its House of Delegates. A reputation of strength and aggressiveness has made the voice of Texas one to reckon with in

the affairs of the American Medical Association, but this voice can be made ineffectual if the number of its delegates must be cut. It seems apparent that those who approve of A.M.A. policies and want them continued and those who find fault with certain of those policies and want them modified have equally cogent reasons for desiring to keep a large, effective representation in the A.M.A. House of Delegates.

It is to be hoped that with the advent of a second year of collecting regular dues of $25 for membership in the American Medical Association, the confusion, delays, and errors will be reduced to a minimum. Now, however, it is more important to overlook the red tape of bookkeeping, necessary as it is, and examine closely the values of belonging to the American Medical Association.

THE FIGHT AGAINST TUBERCULOSIS

Although the death rate from tuberculosis has dropped from approximately 200 per 100,000 in 1900 to less than 30 per 100,000 in 1949, more deaths continue to result from the disease than from any other cause known to be preventable. Furthermore, the cost of the tuberculosis control program in the United States has been estimated at $350,000,000 yearly. Although approximately 500,000 persons in the United States are believed to suffer from active tuberculosis, only about half of those are known and thus can be treated and kept from spreading the infection.

As Dr. James E. Perkins, managing director of the National Tuberculosis Association, has stated: "The bacteriological cause of the disease, the tubercle bacillus, is known. The other causes—the factors that lower resistance to the bacilli: malnutrition; physical, mental, and emotional stress; substandard living and working conditions—are known. The ways in which the bacilli pass from the sick to the well are known and it is possible to prevent this transmission. Early diagnosis is possible. And cure is now a frequent occurrence."[1]

Nevertheless, a tremendous health problem still exists, for with so much known about tuberculosis, no one could rest comfortably while the debilitating disease brings suffering to the patient and his family and economic and social loss to the community. The answer lies in still more education, stimulation of case finding, encouragement of rehabilitation programs, and statistical, social, and basic laboratory and medical research. It is for these purposes that approximately 3,000 state and local associations affiliated with the National Tuberculosis Association annually sell Christmas Seals. These campaigns provide funds for year-round activities and offer an opportunity to bring the public face-to-face with the tuberculosis problem which all physicians know exists.

Physicians will want to do their share this year in supporting the Christmas Seal campaign as evidence of their desire to cooperate in completely eradicating tuberculosis.

MILITARY MEDICAL PROCUREMENT SITUATION

The Armed Services program for procurement of medical personnel is progressing, but the recent amendment to the Selective Service Act providing a "doctor draft" has brought about many complex situations.

The Texas State Advisory Committee to the Selective Service System has been cloaked officially with federal authority and the State Committee has been directed and authorized to delegate such authority to county procurement and assignment committees.

The Selective Service System, in its Operations Bulletin No. 10, has instructed local draft boards to work with local procurement and assignment committees, and to give consideration to recommendations of local medical com-

[1]Perkins, J. E.: Christmas Seal Versus TB, Bull. Nat. Tuberc. A. 36:146 (Nov.) 1950.

mittees for deferment of inductees or delay in reporting for active duty in the case of reserve medical officers.

Present policies of the National Advisory Committee to Selective Service indicate that reserve officers who are serving internships or last year residencies may be given delays in reporting for active duty until completion of such assignments. However, this ruling is not applicable to persons in priority one, who do not hold reserve commissions. Such persons may be inducted at any time, as recruits, and even if they receive commissions ultimately, they will not be eligible for the additional pay of $1,200 per annum which is given to volunteers.

Adding to the complexities of an already complex situation, in some states various persons have strongly urged all physicians in priority one to volunteer immediately, and many have done so. Other persons in other states have advised potential inductees to remain in status quo — saying that sufficient volunteers will be procured in other states to fill all existing vacancies. This could be true. Unless this situation is resolved soon, it is conceivable that a few states may furnish and commission so many volunteers that induction of medical draftees from other states may be practically nil. Obviously, this will create an inequable situation.

In our opinion, it is dangerous, obviously, for medical organization officers to offer blanket advice to prospective draftees. All registrants should be well aware of their individual status. Certainly, they are liable to induction at any time, as recruits. In the normal course of local draft boards meeting their requirements for medical personnel, these registrants may be called immediately, or they may not be called for very extended periods. In any event, they will be inducted as recruits and not as officers.

On the other hand, registrants who volunteer and apply for commissions may be processed and commissioned in a few days, may or may not be called to duty immediately, probably will be deferred to complete training as interns or residents, and will enter active duty as officers and receive additional pay at the rate of $1,200 per annum, when and if called.

Officials of the State Medical Association of Texas have not attempted to establish any blanket policy to be followed by medical draft registrants. Officers of this association have carefully explained both avenues of procedure to those individual registrants who have sought their counsel, but have refrained from giving outright advice. It is up to the individual registrant to weigh his chances and determine his own course.

CURRENT EDITORIAL COMMENT

INFLUENZA OR ACUTE RESPIRATORY DISEASE?

Clinically there are no absolute criteria which can be used to diagnose influenza, and certainly in interepidemic periods the diagnosis is not easily made with accuracy at the bedside. Physical examination, blood studies, and roentgen examination usually only rule out other conditions, but complement fixation tests on paired serum samples are accurate for influenza. In these tests a sample of blood taken during the acute phase of the illness is checked against a second sample taken from ten to fourteen days later. If the titer for influenza virus has increased fourfold or more, the diagnosis of influenza is confirmed, especially if the supplementary red blood cell inhibition test of Hirst[3] is in agreement. Failure to confirm influenza should be sufficient reason to make a diagnosis of acute respiratory disease rather than to assume that a variant influenza virus is the causative agent, for experience with epidemic in-

This department of the JOURNAL *presents editorial comments on current items pertaining to the science, art, and practice of medicine, contributed by members of the State Medical Association and scientists closely associated with the medical profession of Texas. Invitation is hereby extended to any member of the State Medical Association of Texas to submit such discussions for this department. The discussions should not be more than 500 words in length.*

fluenza has shown that mixed types of infection are not found.

The Commission on Acute Respiratory Diseases reported on its studies of common acute illnesses of the respiratory tract as they occurred for three years among Army personnel at Fort Bragg, N. C.[1] It was shown that acute respiratory disease, one of four clinical entities into which the illnesses were grouped, accounted for about 75 per cent of all admissions to the hospital for respiratory conditions. Symptoms presented were of fever, headache, malaise, sneezing, nasal discharge, sore throat, hoarseness, cough, and chest pains. The most common physical findings were of nasal obstruction from congestion, nasal discharge, and lymphoid hyperplasia of the nasopharynx. In 90 per cent of the cases, the onset was gradual and only rarely did the patient appear either moderately or seriously ill. The total white cell count was usually normal and averaged 8,354 per cubic millimeter of blood in 246 cases; leukocytes averaged 66 per cent of the total. The illness was of short duration, and in a majority of patients a fever of 100 F. or more did not exist for more than three days. The average maximum temperature was 101.1 F.

In summarizing its studies, the Commission stated that acute respiratory disease is well known and largely ignored. It occurs in epidemics and has been called "febrile catarrh," "catarrhal fever," "febrile cold," "grippe," and "flu." Clinically, it cannot be distinguished from influenza, but it is neither a coryzal syndrome nor is it related to the common cold. There are no characteristic physical findings, and although its cause is unknown, there is much to suggest a virus etiology.

From September 3, 1949, through June 3, 1950, 269,314 cases of influenza were reported in the United States; of these cases Texas reported 123,314 (46 per cent).[4] At Randolph Field 54 cases which suggested influenza were studied during this period. Of these only 13 were proved to be influenza by serologic tests, and the rest were considered to be acute respiratory disease.

To the clinician it probably matters little whether the patient has influenza or acute respiratory disease. The treatment is nonspecific in both cases and the mortality is not high as a rule. What does matter is that if influenza is reported by enough physicians, someone either is going to start vaccinating for influenza or is going to recommend it to the public at large.

Prophylactic vaccination against the presently occurring forms of the influenza virus is of doubtful value because antigenically the viruses appear to be changing slowly and steadily,[2] and earlier isolated strains appear to be of little value when used to produce protective antibodies against current infections. It is not improbable, however, that a cycle may occur, and then, should there be a suitable vaccine stockpiled or otherwise readily available, a great reduction in morbidity can be expected through vaccination.

It is fairly well accepted that an epidemic must be as accurately diagnosed as an illness in order that proper treatment can be started. The general practitioner, as well as the doctor in military service, is in an excellent position to help with this diagnosing. It is a simple matter to take a blood specimen during the acute stage of an influenza-like illness, refrigerate it, take a second sample two weeks later, and subject both to confirmatory laboratory procedures. Proved cases of influenza lead to isolation of the agent and perhaps to worth-while vaccination. Unconfirmed clinical diagnoses lead but to confusion.

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ORIGINAL ARTICLES

MALIGNANCY OF THE LUNGS

I. Value of Bronchoscopy

GEORGE S. McREYNOLDS, M.D., Galveston, Texas

CERTAIN cardinal signs and symptoms of pulmonary neoplasms always should be kept in mind. Of course, the late signs and symptoms are likely to be obvious and need not be stressed. From the endoscopist's point of view, the earlier signs and symptoms occur in those patients in whom there is no roentgenographic evidence of pulmonary disease. Also, on physical examination of the chest in some instances there may be no findings that would lead the examiner to suspect pulmonary pathologic conditions. The signs and symptoms to keep in mind are primarily those of bronchial disease, since by far the greater portion of pulmonary neoplasms begin in the bronchi themselves.

The earliest symptom to consider is a continuous cough for which there is no apparent explanation. Too often these coughs are catalogued with the indefinite diagnosis of "cigaret cough" or "chronic bronchitis." Early, the cough may be nonproductive and only later, when bronchial obstruction results in secondary suppuration distal to the obstruction, may it become productive. It is also important to note the character of the cough. Most physicians have seen patients who have had a cough for a number of years and who have been observant enough to note a change in its character.

Another important sign of possible bronchial neoplasm is recurrent episodes of pneumonia or pneumonitis in the same bronchopulmonary segment or lobe. Too frequently, we physicians at the Medical Branch see the patient who has been treated with sulfonamides or antibiotics for what was supposedly pneumonia which recurred in the same pulmonary segment on several occasions within a short period of time. This suppuration which is secondary to bronchial obstruction will respond, at least temporarily, to one of the antibiotics with relief of symptoms and in many instances clearing of the roentgenographic evidence of disease only to have "a relapse" within a few weeks.

The patient whose early symptoms include hemoptysis is fortunate in many ways, for this symptom usually is frightening both to the patient and to his physician and will precipitate a rather thorough investigation of its cause.

One of the most important symptoms from the endoscopist's point of view is a wheeze. This symptom always indicates some degree of bronchial obstruction, which may, when the wheeze is limited to one lung or a portion of one lung, be due to a number of different conditions. Of course, tracheal narrowing may produce a wheeze heard in both lung fields. Too often, these patients are treated for weeks or months for asthma without any other confirmatory evidence of an allergic state.

Another important sign of bronchial disease is an obstructive emphysema involving a portion of a lung or an entire lung. At times this condition may be apparent from physical examination, but more often it is diagnosed from either fluoroscopic or roentgenographic studies. When the bronchial obstruction becomes complete, atelectasis results, and then the diagnosis of bronchial disease is apparent. Unfortunately, by this time the disease usually is too far advanced for therapy to be of much avail.

Bronchoscopic examination may be advisable when any of the symptoms mentioned cannot be explained. In addition to the direct visualization and removal of tissue for accurate histologic diagnosis, bronchoscopic examination in cases of suspected or certain pulmonary neoplasm can provide other information of paramount importance to the thoracic surgeon. The possibility of mediastinal metastasis may be suspected by virtue of vocal cord motility, the appearance of the carina, the displacement of the major bronchi, or compression of a bronchus or the trachea. Also, bronchography at times may give the surgeon a graphic visualization of the site and size of the tumor. As a routine procedure, however, bronchography may not be desirable from the surgical point of view.

CASE REPORTS

The following case demonstrates many of the signs and symptoms of bronchial obstruction which may result from a bronchial neoplasm:

CASE 1.—Mrs. B. M., aged 29, a white woman, was first seen at John Sealy Hospital in March, 1942. She gave a history of an illness which apparently had started about seven years before when she had lived in the western part of the United States. During this illness she had had episodes of

Read before the joint meeting of the Sections on Radiology and Clinical Pathology, State Medical Association of Texas, Annual Session, Fort Worth, May 4, 1950.

chills and fever accompanied by coughing and hemoptysis. Most of this time the patient was in bed because of weakness and shortness of breath. Five years prior to her first examination at John Sealy Hospital a diagnosis of tuberculosis was made and she was treated with bed rest. After two years she was finally examined by bronchoscopy and a tumor obstructing the right main bronchus was found. Part of this tumor was removed and was diagnosed as an adenocarcinoma. The patient subsequently was given roentgen therapy and had been considered as cured of a bronchial carcinoma.

When she was first admitted to John Sealy Hospital, roentgen examination of the chest showed some displacement of the mediastinum to the right with increased markings in the right lung field. A bronchoscopic examination was done and a tumor protruding into the lumen of the right main bronchus at the level of the bronchial orifice of the upper lobe of the right lung was visualized. In addition, purulent secretion could be aspirated from the bronchus distal to the obstruction. This tumor was examined by biopsy on several occasions and was finally considered to be a benign adenoma of the bronchus. Iodized oil was instilled for bronchography of the right lung, and this procedure demonstrated a bronchiectasis involving the entire right lung and apparently due to the long-standing bronchial obstruction. Finally, because of the extensive bronchiectasis, this patient in 1944 had a pneumonectomy from which she made an uneventful recovery. Ten months later she had a normal full-term delivery and since that time she has had a second child. She continues to be in good health.

We do not have a detailed enough account of this patient's earlier history to determine her symptoms because the severer symptoms which she had when the bronchial obstruction became more complete overshadowed those which were earlier and less severe.

If there had been a keen observer to chronicle the earlier symptoms, we undoubtedly would have learned that she began with a chronic cough, at first nonproductive. Later this cough became productive and was accompanied by hemoptysis. When the obstruction of the bronchus became more nearly complete, she began to show signs of suppuration as evidenced by the episodes of chills and fever.

One symptom which is important in bronchial neoplasm and which this patient did not mention is wheezing. Undoubtedly she had wheezing at one stage of her disease. Any patient with a partial bronchial obstruction has a wheeze on expiration as a result of air passing through a localized narrowing in the bronchus. Far too many such cases are treated as asthma too long because of this wheezing without any other confirmatory evidence of an allergic state.

At about the same time or shortly following the period of wheezing, this patient developed another sign that is important in the early diagnosis of bronchial or pulmonary neoplasm: a shift of the mediastinum. A bronchial obstruction partial on inspiration but complete on expiration will cause an obstructive emphysema. A shifting of the mediastinum occurs, resulting in shortness of breath. This may be demonstrated by physical examination, fluoroscopy, and roentgenographic films taken on inspiration and expiration.

Finally, this patient developed an atelectasis of the entire right lung, apparent both from her symptoms and from the roentgenographic evidence of the extensive bronchiectasis of the entire right lung.

This case is an unusual example of the signs and symptoms which may result from a bronchial neoplasm since the seeming benignancy of the lesion has provided a long history of illness. Most patients with malignant neoplasms are seen in only one stage of the process or may go so rapidly from one stage to another that it is impossible to recognize them. Therefore, it is necessary that all stages of the condition be kept in mind.

As others have stated and as illustrated in the following case, age is not an accurate index to the possible development of pathologic conditions in the lungs:

CASE 2.—C. D. P., a white man aged 33, was admitted on the psychiatric service with the provisional diagnosis of a mild manic-depressive psychosis or a psychoneurosis. In the routine history, it was noted that he had a chronic nonproductive cough. A routine physical examination did not reveal any significant abnormalities. Likewise a consultation with one of the members of the medical staff did not reveal any definite evidence of pulmonary disease. Because of the chronic cough and the negative physical and roentgenographic findings, a bronchoscopic examination was requested.

At the time of the bronchoscopic examination, it was noted that there was a partial obstruction of the upper lobe of the right lung. Visualization of the bronchus of the upper lobe of the right lung with the Broyles's right-angle telescope demonstrated a tumor almost completely obstructing the bronchus. Attempts to secure a satisfactory biopsy specimen were unsuccessful. Nevertheless, because of the presence of a tumor, exploratory thoracotomy was advised and the patient agreed to the procedure. A specimen for biopsy obtained at operation was reported as adenocarcinoma and a pneumonectomy was done.

This case illustrates the ideal time for the diagnosis of pulmonary neoplasms. Unfortunately few cases are seen in this early stage. Also it illustrates the importance of seriously considering the symptom of an inexplicable cough. The physician must exhaust all of the etiologic possibilities before accepting such a vague diagnosis as "cigaret cough" or "chronic bronchitis."

Three other cases illustrate the value of bronchoscopy and some of its limitations in the study of pulmonary lesions:

CASE 3.—J. C. A., a white man aged 51, was first seen by me in May, 1949, with a chief complaint of cough and one episode of hemoptysis. He had had no pain, dyspnea, or fever. There was a history of a dental extraction preceding his episode of hemoptysis. He was referred to John Sealy Hospital with a roentgenologic diagnosis of abscess of the upper lobe of the left lung. Bronchoscopic examination showed a small amount of secretion with a rather foul odor coming from the upper lobe of the left lung. There was no evidence of any other pathologic condition in the accessible bronchi. This patient showed no evidence of change after a

period of observation in the hospital and was referred to surgery for excision of the abscess. This lesion proved to be carcinoma.

CASE 4.—R. E. C., a white man aged 50, was referred to John Sealy Hospital because of chronic cough and roentgenographic evidence of disease in the upper lobe of the right lung. He had been studied elsewhere for a possible tuberculous lesion and several negative sputum examinations had been reported. Again, examinations of sputum and gastric washings at John Sealy Hospital were all negative for acid-fast bacilli. Bronchoscopy did not reveal any unusual signs. Even with the right-angle telescope, giving a good visualization of the subdivision of the bronchus of the upper lobe of the right lung, no pathologic condition was demonstrable. Because of some questionable findings on fluoroscopic examination of the esophagus, an esophagoscopic examination was done. In the midthoracic section of the esophagus, an indentation on the anterior wall had the feeling of a calcified mass as the tip of the esophagoscope moved across it.

The patient was considered to have a suppurative disease of the upper lobe of the right lung and the question of surgery was discussed with him. He was not anxious to have surgery and finally was dismissed from the hospital; however, he returned one month later. His general health had become much worse and a roentgenogram of the chest showed an increase in the pathologic condition in the upper lobe of the right lung. At this time, he was willing to submit to surgery. A thoracotomy was performed and a nonresectable carcinoma was found.

CASE 5.—D. S., a white man aged 45, was first seen in June, 1947, because of a chronic cough and roentgen-ray evidence of disease of the upper lobe of the right lung. Bronchoscopy at that time did not reveal any tumor, and the patient was considered to have a suppurative disease of the upper lobe of the right lung; however, the possibility of neoplasm was also considered. A bronchogram at the time of this first admission showed some slight constriction of one of the subdivisions of the upper lobe. The patient was advised to have surgery but refused and was discharged from the hospital. He was somewhat upset by the suggestion of a tumor and took refuge in drinking large amounts of alcohol. He was not seen again until October, 1947, at which time bronchoscopic study was again negative. The patient at this time submitted to surgery and a partial lobectomy was performed. He was readmitted in February, 1949. There had been an increase in his symptoms as well as an increase in the disease of the upper lobe of the right lung. Another thoracotomy and a pneumonectomy were performed.

SUMMARY

Symptoms of chronic cough, recurring episodes of pneumonia or pneumonitis in the same bronchopulmonary segment or lobe, wheezing, hemoptysis, or obstructive emphysema may be evidence of pulmonary neoplasms and should encourage an examination by bronchoscope. A bronchoscopic examination may provide direct visualization and removal of tissue for accurate histologic diagnosis, give graphic visualization of the site and size of a tumor, or suggest the presence of mediastinal metastasis because of vocal cord motility, the appearance of the carina, the displacement of the major bronchi, or compression of a bronchus or the trachea. Cases illustrating the value of bronchoscopy in the study of pulmonary lesions and some of its limitations are presented.

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MALIGNANCY OF THE LUNGS

II. Pathology

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LITTLE is known about the exact causation of tumors of the lung. They occur more often in the Caucasian than in the Negro race and are several times more common in men than women. The peak of incidence according to age is approximately the sixth decade.

The histogenesis of pulmonary neoplasms has been the subject of considerable controversy. Apparently most of the carcinomas arise from bronchial epithelium, but some of the mucus-producing growths arise from bronchial glands. The histogenesis of the so-called bronchial adenomas is still controversial.

Tumors of the lung may be classified according to location into hilar, peripheral, diffuse, and miliary. In addition there are the apical or Pancoast growths. Approximately 90 per cent of primary pulmonary malignancies are in the hilar region and some 6 to 8 per cent in the peripheral portions of the lung. Occasionally a tumor may spread diffusely to involve a considerable portion of an entire lung. Supposedly a few rare cases of primary miliary carcinomas exist; however, it should be ascertained with certainty that the condition is not really miliary size metastases.

Microscopically, malignancies of the lung usually are classified as squamous carcinomas, adenocarcinomas, and the small cell or undifferentiated type. In addition bronchial adenomas might be considered in a special group. Little correlation is noted between the gross and the microscopic classifications except in mucous carcinomas, where the cut surfaces of the lungs often are bathed in an excess of mucus.

It should be emphasized that extensive secondary changes may occur not only in the tumor itself but elsewhere in the involved lung. In the tumor degenera-

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tion, necrosis, inflammation, and liquefaction may develop with pseudocyst or abscess formation, while elsewhere in the lung bronchiectasis, pneumonia, and atelectasis may occur.

Functionally the cough so frequently associated with pulmonary malignancy probably is due to the tumor growing into or pressing upon a bronchus. The associated pain likely is caused by pressure of the growth on the intercostal nerves and the nerve roots about the vertebral column and also by tumor invasion of the pleura. Hemoptysis is explained by ulceration of the tumor or of the compressed bronchus, whereas fever which so often accompanies the course of the disease can be explained as resulting from secondary pulmonary infections, bronchiectasis, and even pneumonia. Cough likely is caused by bronchial irritation either from compression or invasion by the tumor.

Dyspnea may be caused by a number of factors. The vital capacity of the lung may be reduced because of pleural effusion or obstruction to a bronchus supplying the whole or a considerable portion of one lung. Partial obstruction of a bronchus may result in poor aeration of a whole lobe or an entire lung. Because of this poor aeration, the blood, which still passes through the portion of unaerated lung, is unable to carry out its normal interchange of carbon dioxide for oxygen; hence, the venous blood returns to the left part of the heart to mix with the normally oxygenated blood returning from the uninvolved portion of the lung. The loss of weight and appetite and the associated anemia and weakness are explained best on the basis of general neoplastic cachexia and secondary infections.

Metastases from lung tumors are all too frequent, especially later in the disease. The most common sites of metastasis are the hilar lymph nodes, but other lymph nodes including those in the retroperitoneal and cervical regions are not spared. It is well to remember that extension or metastasis to the serous surfaces is common. These extensions or metastases often are associated with fluid in the involved cavities.

Of metastases to the viscera the common sites are the brain, liver, adrenal gland, kidneys, and bone. The frequency of cerebral metastasis makes it important if possible to exclude a primary pulmonary malignancy in cases of suspected intracranial neoplasm. It is especially important to remember that the primary growth in the lungs may be small at the time intracranial metastases develop.

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MALIGNANCY OF THE LUNGS

III. Place of Anesthesiology

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IN considering surgical intervention for any pathologic condition of the bronchopulmonary system the anesthesiologist essentially is concerned with the general well-being of the patient before, during, and after the operation. To ascertain the variations from normal in respiratory and circulatory physiology, the general classification of the disease and its specific effects on the patient must be known.

The character of the disease frequently indicates the respiratory and circulatory complications present, those which will develop during the operative procedure, and frequently those which will affect the patient after operation. A general classification of complications involving the bronchopulmonary tree is as follows:

A. Intrinsic involvement.
   1. New growth—benign or malignant.
   2. Congenital disease—cyst, atresia, or agenesis.
   3. Traumatic disease — chemical stenosis, foreign body, or crush injury.
   4. Infection — abscess, bronchiectasis, tuberculosis, or granulomas.

B. Extrinsic involvement.
   1. Mechanical—aneurysm, double aorta, or adhesions.
   2. Metastatic invaders — tumors of esophagus, thymus, or mediastinum.

The limitation of gaseous exchange to any part of the lung is determined by the intrinsic or extrinsic relationship of the lesion to the tracheobronchial tree. Intrinsic lesions may narrow or occlude the lumen of the air passage by direct growth in the wall or by involvement of the distal alveolar field. In many instances, a secondary pathologic condition arises distal to the point of obstruction. The extrinsic lesions usually occur in the associated mediastinal or pleural structures and affect the bronchopulmonary structures mechanically or as metastatic invaders.

From the Department of Anesthesiology, The University of Texas Medical Branch.

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Generalized tissue changes secondary to the lesions may result in fibrosis, thickened pleura, atelectasis, bronchiectasis, and changes in the structure of the capillary bed of the alveolar walls. These changes usually produce complications of mucus, pus, blood, or edema in the lung.

Before operation an evaluation of the patient's physical condition with special emphasis on vital capacity and circulatory balance is indicated. Preparation of the patient for operation includes postural drainage or bronchoscopic aspiration to remove secretions from the lung. In some instances pneumothorax may be indicated to insure against a shifting mediastinum which may occur after the chest is opened.

After the patient is anesthetized and the trachea intubated, the plane of anesthesia is stabilized at a level at which respiration, circulation, and reflexes can be controlled within a reasonable degree.

The efficiency of respiration depends upon the activity of the respiratory center, the patency of the airway, the integrity of the bony cage of the chest wall, the negative pressure effects upon the pleural surfaces of the lungs, and the ventilation coefficient of the alveolar mechanism. When the chest wall is cut and the pleura opened, the efficiency of ventilation may be diminished to a dangerous degree. Therefore, to assure adequate respiratory exchange, positive pressure of varying degree is exerted against the internal structure of the lung field by pressure on the breathing bag. Movements of the lung fields and diaphragm are carefully controlled. Without this stabilizing pressure, paradoxic respiration and a shifting mediastinum may occur, usually resulting in severe shock.

COMPLICATIONS

Respiratory complications occur in the form of partial atelectasis from poor ventilation and obstruction due to retraction or angulation of a bronchus. Breaking loose a piece of tumor or rupturing an abscess, cyst, or tuberculous cavity may flood the lung with enough pus, blood, or caseous material to cause drowning. Excess pressure against the pulmonary bed may result in edema of the lung secondary to cardiac damage.

Circulatory complications may be manifest in cardiac irregularities associated with anesthetic drugs, neurologic stimuli, or manipulation in the region of the heart and great vessels. These irregularities as a rule are not fatal unless the myocardium has been subjected to a period of low oxygen tension. Hypotension may be due to poor peripheral vascular tone secondary to the patient's physical condition, overdose of anesthetic drugs, or depression of the vasoconstrictor centers from some form of neurogenic stimulation. Decreased cardiac output may result from excess pressure against the pulmonary bed or compression of the large veins returning blood to the heart. This decreased output may result in pulmonary edema or shock if the vasoconstrictor compensatory mechanisms are repeatedly or totally depressed. Direct trauma to an intact lung field from retractors or overloading the vascular system with intravenous fluids may result in cardiorespiratory complications during or after the operation.

Neurogenic complications are manifest through reflex response to stimulation. These reflexes occur with stripping of the periosteum, opening of the pleura, and stimulating of the vagal end-organs in the lung and great vessels. Angulation, traction, or clamping of the bronchus may cause an acute circulatory depression. Rough handling and incautious blunt dissection may produce the same result. Repetition of these neurogenic insults produces serious shock.

CONCLUSION

The classification of a patient's bronchopulmonary difficulties is important to the anesthesiologist, who must be able to anticipate the physiologic variables of the existing complications. He also must be prepared to maintain a respiratory and neurocirculatory balance for the patient while the lung field is exposed and the pathologic lesion is being removed.

OCCUPATIONAL CANCER CONTROL URGED

With the knowledge that about 200 chemicals are possible cancer-producing substances, Dr. J. R. Heller, Jr., director of the National Cancer Institute, Bethesda, Md., writing in the *Archives of Industrial Hygiene and Occupational Medicine* for October, has called for the joint efforts of industrial and labor organizations and local, private, and state health agencies to aid in the further discovery and control of these agents.

More research into the background and case histories of cancer patients, laboratory testing of suspected cancer-producing agents, follow-up studies of exposed workers, and studies of safety procedures and preventive measures in plants where such substances are handled are necessary, he believes, to solve the mystery of environmental and occupational cancer.

AUREOMYCIN AND TOOTH EXTRACTIONS

Aureomycin has been successfully used to reduce bacterial invasion of the blood as a result of tooth extraction, a factor of particular importance to patients with heart conditions.

In the October issue of the *Archives of Internal Medicine*, Drs. Oscar Roth and Robert H. Parrott and A. L. Cavallaro, oral surgeon, and Rose Celentano, medical technologist, all of New Haven, Conn., report on 50 patients, half of whom received aureomycin and half of whom were untreated. Blood tests revealed Streptococcus viridans in 14 of the untreated patients but in only 1 of the patients who received the drug.

The physicians state that 20 per cent of all cases of subacute bacterial endocarditis can be traced to recent dental manipulation.

MALIGNANCY OF THE LUNGS

IV. Role of Thoracic Surgery

A. W. HARRISON, M.D., Galveston, Texas

IN this paper are discussed some of the facts and figures that have brought from the thoracic surgeon the outcry that early suspicion and early diagnosis are the great need in solving the problem of cancer of the lung. Its purpose is to make clear what the thoracic surgeon can offer the patient under present circumstances and point to some of the pitfalls which can be expected. In addition, two important principles are emphasized: (1) Surgical exploration is necessary in doubtful cases and in proved cases except where strict contraindications exist. (2) Palliative lung resection not only is justifiable but is desirable whenever practicable.

MORTALITY AND SURVIVAL

The figures in this discussion are taken from reports of such men as Graham, Ochsner, Reinhoff, and Adams in the larger clinics over the country. Some represent averages; others, specific figures.

The statistics must be seen in proper perspective to be appreciated. Gross survival rates, for instance, are uniformly low, ranging from 5 to 7 per cent, but a person who develops cancer of the lung now probably has a much better chance than this rate would indicate. Five per cent represents an average of all past cases with whatever circumstances might have attended, and that chance of survival does not necessarily apply to any specific instance. Each case must be judged on its own merits.

The 5 per cent gross survival rate can be reached in the following manner: Of the patients who report to the larger medical centers with cancer of the lung, only about 30 per cent are able to have a resection of some sort, and usually about one-half of the remainder are subjected to exploratory surgery. As Ochsner stated, of every 3 patients who report with cancer of the lung, 1 obviously is inoperable, 1 proves nonresectable, and 1 has a resection. Although it is more difficult to generalize further, gross postoperative mortality rates average about 20 per cent. Mortality rates for the last year or two are reported in some places to be as low as 5 per cent, and on the Chest Surgery Section at Galveston 1 death has occurred in about 25 patients in the last three years, a group too small to be significant. However, using the average postoperative mortality rate of 20 per cent, the percentage of cancer patients leaving the hospital after resection is about 25 per cent of the original. A five year survival of approximately 20 per cent of those who leave the hospital gives a gross survival rate of about 5 per cent of the original.

An analysis of the number of patients who have resections indicates that approximately 50 per cent are dead within one year; figures vary from 40 to 60 per cent. An additional 20 per cent are dead within the second year and 10 per cent more within the third year. Apparently anyone living three years has a good chance of living for an indefinite period, for the five year survival rate is about the same as the three year survival rate. These are conservative average figures and include cases in which resection was obviously only palliative; palliative surgery in some series ran as high as 70 per cent. Specifically, Graham reported a five year survival of 28 per cent, Ochsner of 27 per cent, Adams of 30 per cent, and Reinhoff of 20 per cent.

It would seem logical to assume that a patient operated upon today would have a much better chance of survival than formerly because of improved techniques. Undoubtedly he has, but it is not as good as might be expected. The mortality rate has been cut from about 40 per cent to 5 per cent in the last twelve to fifteen years. However, surgeons have become more aggressive and are doing more palliative procedures so that the survival rate is still probably not much more than 30 per cent for the five year period.

EXPLORATORY SURGERY

The following case reports illustrate some of the difficulties encountered in making any significant inroad on the mortality rate of cancer of the lung.

CASE 1.—The patient was a white man 45 years old who had pneumonia in 1947. A roentgenogram (fig. 1a) showed a shadow extending outward from the right hilum, but bronchoscopy and Lipiodol bronchographic studies did not reveal any evidence of carcinoma. Finally the patient was persuaded to have an exploratory operation and in October, 1947, a lung abscess was removed from the anterior portion of the upper lobe of the right lung. A diligent search was made at operation and the resected lung carefully examined but no cancer could be found.

A roentgenogram in March, 1948 (fig. 1b), showed almost complete clearing of the right lung. In September a recurrent mass in the right hilum was discovered but the patient refused operation. By January, when he finally consented, his right diaphragm had become paralyzed (fig. 1c), and operation in February, 1949, showed a nonresectable squamous cell carcinoma invading the heart along the pulmonary veins. The patient was given several courses of deep roentgen therapy and more than a year later was still working.

Circumstances conspired to deny the patient in case 1 of what might have been an excellent chance of cure.

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CASE 2.—This patient was a 50 year old white man with symptoms and signs of respiratory difficulty, including clubbing of the fingers, of several years' duration. The most important feature was recent persistent slight hemoptysis. A roentgenogram revealed a chronic inflammatory type of lesion in the upper lobe of the right lung with emphysema and some bronchiectasis. The possibility of cancer was considered and lobectomy was advised, but the patient wished to go home for a month. Since no diagnosis was definite, argument to the contrary was not strenuous. By the end of the month the patient had begun to have pain, and roentgenograms showed a mass alongside the upper portion of the mediastinum.

A lobectomy of the upper lobe of the right lung was done with removal of the tumor, which already had become attached to the mediastinum. Intensive deep roentgen therapy was begun but by January the patient was in poor condition; in all probability he has not survived until now.

Again, the history and appearance of what seemed to be a benign inflammatory lesion completely clouded the presence of a malignancy until too late. The only possible warning was the hemoptysis, even though this symptom frequently is seen in upper lobe or "dry" bronchiectasis. This case and other similar experiences have made me less inclined than ever to accept an explanation other than carcinoma for hemoptysis in a man older than 40 years.

CASE 3.—A 51 year old white man's only complaint was streaking hemoptysis for one month. The roentgenogram (fig. 2) showed a cystlike lesion in the lingula. Bronchoscopy was negative.

At operation in May, 1949, a well-circumscribed, discrete thin-walled cyst was found and a clean segmental lingulectomy removed the lesion completely. A frozen section examination was not done because the nature of the lesion seemed obvious. Next day permanent sections revealed squamous cell carcinoma. This was explained to the patient, and two weeks later his lung was removed. The prognosis seems to be good.

The error in case 3 was in judgment, a factor that will be difficult ever to eliminate entirely in the attack on cancer.

CASE 4.—A 45 year old white man noticed the onset of symptoms in June, 1949. He reported to his family physician on July 19. Diagnosis of cancer of the lung was made by bronchoscopic biopsy (fig. 3a), and a pneumonectomy was performed August 5. A few days before operation the patient developed pain in the back, but roentgen studies of the spine were negative. He recovered well from the operation but was dead within six months in spite of roentgen therapy. The pain was caused by metastases to the spine as evidenced by the later collapse of the tenth thoracic vertebra (fig. 3b).

Few patients are treated earlier than in case 4, yet a gamble and race against time in this instance was of no avail.

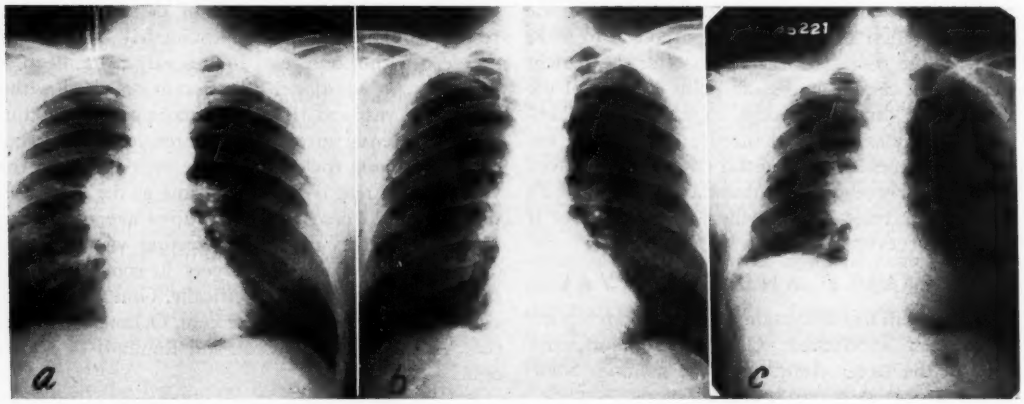

FIG. 1. Case 1. a. Roentgenogram showing a mass in the hilar region representing a lung abscess.
b. Another roentgenogram taken after excision of the abscess showing almost complete clearing.
c. A third roentgenogram taken nine months later showing reappearance of the hilar shadow with phrenic paralysis. The suspicion of cancer was confirmed.

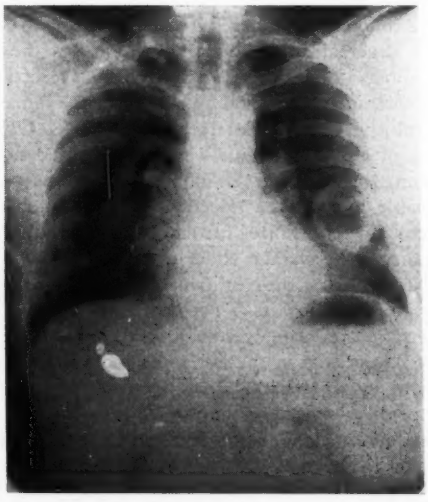

FIG. 2. Case 3. Peripheral circumscribed carcinoma in the lingula with almost complete shelling out.

Experience with such patients together with the low mortality for surgical exploration alone leaves little doubt that surgery is anything but the last resort. I believe that any patient in whom malignancy is reasonably suspected should be subjected to exploratory surgery. At Galveston we have had no deaths in some 25 such operations. Others report extremely low mortality rates, and the survival time of surgical patients is roughly as good as for those not operated upon.

Various authors report that from one-third to two-thirds of the patients in whom the lung is resected show regional lymph node involvement at operation. The survival rate for these patients is roughly one-third that for those without metastases—another argument for early operation. It is significant, however, that a number of those with node metastases may live five years or even more.

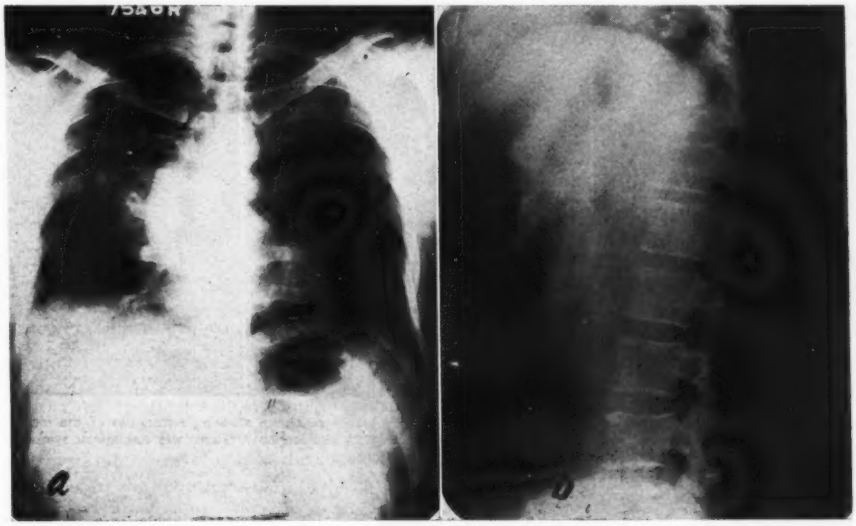

FIG. 3. Case 4. a. Preoperative roentgenogram of a man aged 45 who died in spite of the fact that his lung was removed within two months of onset of symptoms.

b. A roentgenogram showing collapse of vertebra occurring shortly after pneumonectomy. Preoperative roentgenograms showed a normal spine.

PALLIATIVE SURGERY

In considering palliative surgery, it must be remembered that the average length of life after diagnosis for those without operation and those with exploratory surgery alone is about five and one-half months. Stated another way, according to Ochsner, 15 per cent of the patients upon whom resection is not performed are alive in six months and none in three years. Contrast this with the report of one author that in a group of patients dead of recurrence there was an average survival of 11.4 months after resection was performed and the report of another that 10 per cent of his patients upon whom palliative surgery was performed lived three years or more. These are significant figures and an argument for resection whenever possible.

Another factor to be considered is the relative comfort of the patient during the days that remain to him. It is true that he must endure the discomfort of an operation and still have the prospect of dying before him. Among physicians who have cared for patients dying of cancer of the lung, however, there is little doubt that those in whom the lung has been removed fare much better. The relief from the racking cough, the horror of hemoptysis, and toxicity from the lung infection is well worth the operation. The actual total pain is much less in that recurrences, except for skeletal involvement, are less likely to be invasive and painful.

Finally come those factors upon which rests the decision during operation to resect the lung. They are (1) tumor type, (2) probable mortality, and (3) complications.

The squamous cell type of tumor seems to offer the best prognosis. Adams reported that 80 per cent of his patients with such tumors lived one year and 36 per cent five years or more. At the other extreme, Graham reported only 14 per cent of patients with squamous lesions surviving five years. In his malignant mixed tumor group, however, 57 per cent lived five years or more, indicating a probable difference in classification. The undifferentiated tumor offers the poorest prognosis, a majority of patients with these tumors being dead in one year and those living as much as

three years being rare. The adenocarcinoma group apparently occupies an intermediate position.

As mentioned before, mortality has now been reduced to a rather low rate. Analysis shows what remains to be largely out of the hands of the surgeon. Cardiac failure and embolic accidents probably account for more than half the postoperative deaths. Progress in anesthesia has reduced the number of deaths on the table, and surgeons now routinely take risks scarcely dared before, such as operating on patients with previous history of coronary occlusion or cardiac failure. The antibiotic drugs have almost removed the threat of infection. No postpneumonectomy empyema or opening of a bronchus has occurred on the Chest Surgery Section at Galveston.

An example of the satisfactory outcome of what at first appeared to be a useless struggle is illustrated by the following case.

CASE 5.—A 67 year old Spanish man had a diagnosis of cancer of the lung made in Spain almost one year prior to his hospital admission in Galveston, but because of his emigration to this country operation was delayed.

At operation the lower half of the patient's chest was observed to be frozen with tumor and chronic inflammatory reaction. The operation was almost a nightmare. Large abscesses were opened into the pleural space, the pulmonary veins were torn, and practically no anatomic planes could be discerned. Ten pints of blood were used during the operation.

Postoperatively the patient developed auricular fibrillation and mild decompensation, and it was difficult to maintain the mechanics of respiration because of excess fluid formation. Yet he soon went home, gained 20 pounds of weight, and was entirely comfortable and active. He died quietly of mediastinal obstruction twenty-one months later without further therapy other than the administration of digitalis.

The next case illustrates a real problem in deciding whether or not a patient has the respiratory reserve to tolerate a resection and also whether or not later thoracoplasty should be attempted for the relief of emphysema and overdistention of the remaining lung. I have performed thoracoplasty in 3 such cases with gratifying results.

CASE 6.—A 52 year old white man was admitted to the hospital with a circumscribed squamous cell carcinoma in the periphery of the right lung. It was evident by roentgen examination (fig. 4a) that he had severe emphysema of both lungs, and this observation was well borne out at operation. The lung was removed, however, and the patient did well for awhile. As the mediastinum retracted he became shorter of breath (fig. 4b), and fifteen months later a thoracoplasty was done with considerable improvement in breathing (fig. 4c). Approximately one year later the patient returned with mediastinal lymph node recurrence.

FIG. 4. Case 6. a. Peripheral circumscribed squamous carcinoma in a 52 year old man with severe emphysema.
b. A post-pneumonectomy roentgenogram showing a marked shift of the mediastinum. The man suffered shortness of breath.
c. A roentgenogram showing restoration of the mediastinum to the midline by thoracoplasty. There was consequent symptomatic improvement.

In view of the fact that a significant number of patients upon whom palliative surgery is performed survive for relatively long periods (10 per cent for three years in Ochsner's series) and that the average life is longer and more comfortable, I believe that the lung should be removed in cases of lung malignancy when at all feasible. Operations in which the risk to the patient's life and comfort are not excessive include even resections of parts of the chest wall, pericardium, and heart. The only definite contraindications to exploratory surgery and hope of at least good palliation are (1) distant metastases, (2) involvement of the trachea, and (3) tumor cells in the pleural fluid.

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University of Texas Medical Branch.

TUBERCULOSIS SURVEYS IN TEXAS

Experiences in San Antonio

HOWARD E. SMITH, M.D., Austin, Texas

THE Texas State Department of Health has conducted mass roentgen-ray surveys in Texas counties for the past three years, covering 180 of the 254 counties. In addition there have been thirty special surveys, principally in colleges and universities, eleemosynary institutions, and penitentiaries. During this three year period more than 1,000,000 persons have had chest examinations.

ORGANIZATION

The survey program assumes the same general form in all counties or cities regardless of their size or population. After a general chairman has been appointed the organization expands in four broad areas: technical phases, operations, community organization, and promotion and education.

The technical phase involves uniform medical policies relating to the scope of the survey, diagnostic standards, diagnostic facilities, disposition of persons with positive findings, hospitalization, and isolation.

The operations committee manages the location of the x-ray equipment, the length of stay of each unit, scheduling, working hours, and registration of people as they appear for examination. These factors are exceedingly important to the success of the survey.

The types of community organization may be diverse, but the basic framework is usually on a neighborhood or district plan whereby workers are in direct contact with individuals. The workers are used in many ways to promote the survey.

In the category of public relations, promotion, and publicity, major emphasis is given to releases to the press and full use of radio facilities. Community meetings, posters, and pamphlets must be relied on heavily in small towns. A speakers bureau serves with profit to deliver authentic brief messages to service groups, clubs, and other organizations. Cooperation from large department stores frequently results in the use of retail advertising outlets for reminders of the survey in progress. Leaflets, pamphlets, and special letterheads may be beneficial in special areas. Tags, utility bills, grocery booklets, laundry parcels, and milk bottle collars are some of the methods used to advertise the survey to the public. House-to-house canvass, visits to commercial, industrial, and professional plants, telephone canvass, and sound trucks are all helpful in providing information and reminders. Volunteer hostesses and barkers at the x-ray machine convince many people who otherwise would not be examined of the need for examination.

Read before the Section on Public Health, State Medical Association of Texas, Annual Session, Fort Worth, May 2, 1950.

SAN ANTONIO SURVEY

The Texas State Department of Health cooperated with the City Health Department of San Antonio in a countywide survey which began January 9, 1950, and continued for eight weeks. Six x-ray units were employed, five being provided by the state and one by the city. Two units were maintained on a stationary basis, whereas the remaining four were moved each week to a new location.

The final statistics for the survey revealed the following results: total roentgenograms 105,038, suspected tuberculosis 1,065, definite tuberculosis 2,331, other conditions 520. The incidence of disease revealed by the miniature films follows the general pattern in surveys elsewhere in the state. Although San Antonio has the highest death rate from tuberculosis of the 96 cities in the United States with more than 100,000 population, there is no significant variation in the morbidity incidence of tuberculosis throughout the state. The lack of significant variation in the morbidity incidence of the disease in Texas is supported by similar observations over the entire United States.

San Antonio had approximately five weeks for preliminary organization and publicity preceding the survey. The period was interrupted by the Christmas holidays, and with public interest centered in the holiday only about three weeks were devoted to concerted efforts in the development of the survey. It is best to avoid interruptions in the organization of the survey, and a longer period of preparation is suggested.

In a city of 200,000 population there is need for a greater number of machines than the six available in San Antonio. A dozen machines would have been more effective. Several bus units could have been used satisfactorily. In bus units the machines can be carried nearer to some groups of people than is possible

with transportable units; people will not go out of their way to get a roentgenogram of the chest. To serve the greatest number of people it is wise to concentrate the largest number of units possible in the shortest period of working time necessary to reach the population of a given area, for public interest cannot be sustained over long periods of time.

In the Bexar County survey probably the greatest errors occurred in the location of the units. We found that public schools were definitely not suitable sites at which to set up survey equipment; the public associated the school site with a school program and adults did not respond. Fire stations also proved to be poor locations; the prohibition of parking within a block of a fire station did not encourage elderly persons to come to the station. For the same reason a first floor location was a necessity. The best location was the Federal Building, which houses the main downtown Post Office.

The locations chosen should be checked for the time of opening and closing of the building and working hours adopted accordingly. Uniform working hours should be followed at each location. The lunch period of personnel should be staggered so that units remain open; many persons can come only during their lunch period. Since many business firms and government offices follow a strict forty hour week it is wise to study the local customs to determine the need for Saturday operations. Large neighborhood grocery stores have the greatest number of customers on Friday and Saturday, which coincide with "specials" and week-end pay days. This same trend is evident in department stores. Sudden changes in the itinerary of the units should not be made because it is not possible to provide the needed publicity. In short, the best locations are the sites where the greatest number of people normally come or pass each day.

Another general observation which resulted from the survey was that it is impractical to supply registration cards to business and industrial firms for preregistration. Most of the cards on arrival at the units are defaced, folded, and inaccurate and have to be redone. The cards used are standard International Business Machine cards, which are machine tabulated. With defacement of the cards the machines do not operate satisfactorily.

The survey in San Antonio provided an excellent public relations and education medium. It focused the attention of the people on the tuberculosis problem and will serve as a yardstick for future tuberculosis control in the city. The survey brought to light many workers who are interested in the disease and are well informed on the need for additional control efforts. They can be relied upon to lend substantial support in future tuberculosis campaigns.

Not the least of the benefits to the community was the detection of a vast number of unrecognized infectious cases of tuberculosis requiring medical treatment. By-products not to be ignored are the numerous cardiac and chest tumor cases which were heretofore unsuspected. The actual survey, however, remains as the easiest part. The important and difficult phase is the follow-up on these uncovered cases, which will extend over the next year.

SUMMARY

A community roentgen-ray survey to discover tuberculosis and other chest conditions should be organized in four areas: technical phases, operations, community organization, and promotion and education.

A survey involving a large population should be preceded by a preparation period of at least two months. Holiday seasons should be avoided in the preparation period.

An effort should be made to use the largest possible number of x-ray units in the shortest working time to cover the population. Schools and fire stations are poor sites for units. Preregistration of people and second floor locations should be avoided. The working hours of the people to be served should guide the hours in which the x-ray units operate.

A survey provides a means of presenting mass education on tuberculosis to the people. Many interested and informed workers are revealed for potential use in future tuberculosis campaigns. Many unrecognized cases of tuberculosis, heart disease, and chest tumors can be placed under medical observation and treatment. The statistical results of the survey may be useful in planning the future needs for tuberculosis control.

The morbidity incidence of tuberculosis shows no marked variation in different parts of Texas.

1908 Vista Lane.

ABSTRACT OF DISCUSSION

DR. AUSTIN E. HILL, San Antonio: Dr. Smith and the Texas State Department of Health are due heartiest congratulations for the fine work they have done in mass chest roentgen-ray surveys during the past three years. These surveys have enabled private physicians, health officers, and public health nurses to place thousands of tuberculous patients in isolation, thereby preventing the spread of tuberculosis and reducing deaths.

The most important things to consider in a mass chest roentgen-ray survey of a large city are the organization of the volunteer workers, the education of the people, and the number and locations of the machines.

The organization of the volunteer groups must be formed from the most able leaders in the community who are willing to accept the responsibility. If any person fails to come through with his part, other phases of the program will be handicapped. For example, if house-to-house visitation is not done, the education of the community will be poor and the results will be reflected by the numbers who visit the machines.

A period of four to six months is needed to prepare the citizenship for its part in the survey. Selecting the dates of operation is also important; for instance, if the opening week is the same as a big drive for community funds or a local festivities week, the survey will suffer. The survey will conflict with the busy schedule of townspeople and will not receive full attention from the local newspapers and radios.

A sufficient number of x-ray machines in good locations is probably the most important thing to be considered. Each machine should be expected to take a minimum of 5,000 roentgenograms each week. The Post Office location in San Antonio provided 5,978 in one week. This proved to be the best. Other good locations were in department stores, large office buildings, and large grocery stores. The Courthouse and City Hall are considered good only during the time taxes are being paid and rendered. The machines that handled the fewest roentgenograms were located at the Transit Company Garage, fire stations, and public schools. Mobile units would have been, we believe, of great advantage, especially for iron foundries, packing houses, breweries, the telephone company, and large warehouses.

The most significant statement in Dr. Smith's paper is "people will not go out of their way to get a roentgenogram of the chest." If more than 50 per cent of the people will not go to fire stations, school buildings, and other out of the way voting boxes to vote in a hot presidential election that has been pushed and advertised in every respect for six months, what can you expect them to do just to get a roentgenogram?

Dr. Smith's paper has an excellent summary. If a survey is to be made in any large city, all of his suggestions should command strict adherence.

MEDIASTINAL MASSES DISCOVERED BY MASS PHOTOFLUOROGRAPHY

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THE advent of photofluorography for civilian use soon after World War II stimulated the use of this procedure for surveying segments of the population for evidence of active tuberculosis. During the past four years, so-called "mass chest photofluorography" has become both popular and practical as the most accurate screening process for tuberculosis in supposedly well persons.

In March, 1947, the Texas State Department of Health inaugurated a program of statewide mass photofluorography for tuberculosis. The Division of Cancer Control, in cooperation with the Tuberculosis Division, attempted follow-up of all the persons who were found to have suspicious, nontuberculous masses in their chests. This paper will present the results of this follow-up program.

CHEST TUMORS

A large variety of neoplasms may occur in the chest. Some of them are benign but practically all of them are potentially malignant. They may originate in the lung, the esophagus, the mediastinum, or the various tissues of the thorax.

Perhaps the most common and by far the most important thoracic cancers originate in the lungs. These are properly termed bronchogenic carcinoma. In fact, it has been established that most of them arise from bronchial epithelium and rarely from the parenchyma of the lung.

Second in importance and perhaps in frequency also are carcinomas of the esophagus. However, since these cancers usually become symptomatic earlier, as a rule they are not discovered by mass photofluorography of supposedly well persons.

Secondary metastatic lesions in the lung are occasionally incidental findings in chest films. Primary malignant tumors of the prostate, breast, and kidney may first be diagnosed by discovery of their metastasis in the lung.

Other varieties of mediastinal tumors include lesions which arise from lymphatic tissues such as lymphosarcoma and Hodgkin's disease, and perhaps less commonly, teratomas, cystic tumors, lipomas, chondromas, osteogenic chondromas, neurofibromas, and neurosarcomas. Although many of these latter lesions are in the beginning benign, statistics and experience show that the vast majority of them eventually cause death because of malignant degeneration, infection, or mechanical pressure on vital structures in the mediastinum.

Unfortunately, until recently lung cancer or bronchogenic carcinoma was considered a rare disease. It has become more and more apparent, partly through mass chest surveys, that its incidence is increasing and that this lesion constitutes one of the most common forms of cancer. Cancer of the lung is now thought to be more common than cancer of the colon and constitutes at least 10 per cent of all cancers. In some clinics, cancer of the lung is found to be more common than gastric carcinoma. Lung tumors are more common in the male than in the female and occur most frequently in the fourth to sixth decades of life. It is important to emphasize, however, that they may be found in either sex and at almost any age. Another type of lung tumor which deserves mention is the so-called bronchial adenoma. These tumors are more frequent in women and are

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usually found in the larger bronchi, but they may arise in any portion of the lungs.

SURVEYS ELSEWHERE

Figures on the incidence of chest tumors found in specific chest roentgen-ray surveys vary widely. A recent survey conducted by the United States Public Health Service revealed the incidence of mediastinal cancer to be .012 per cent. The 1948 tuberculosis roentgen-ray survey of 163,373 persons in New York City uncovered a total of 198 chest neoplasms, an incidence of .12 per cent. Routine roentgenograms of patients admitted to hospitals have shown a figure of .10 per cent or more of chest neoplasms, but this is not a true picture since hospital admissions are a selected population sample. Hilleboe has reported that during a 1938 survey of 75,774 roentgenograms for tuberculosis in upstate New York, 39 tumors were discovered (.05 per cent).

It is evident that one cannot be dogmatic about any particular percentage occurrence of tumors of the mediastinum in the average population. Perhaps the true percentage figure is somewhere between .010 and .10, which is a wide range. I believe that the accurate incidence of these tumors in any particular survey is directly dependent upon the effort made to diagnose these lesions on the follow-up study. This is reflected in the New York study, where diagnostic medical service was available for thorough follow-up study of most suspected cases. The definition of "mediastinal mass or neoplasm" must also be taken into consideration in comparing figures from different surveys. Furthermore, it is important to know whether all masses discovered are included or only definitely proved neoplasms are reported.

TEXAS SURVEY

In our survey there were approximately 611,665 persons who received chest photofluorographs in Texas from October 1, 1948, to December 31, 1949. All of these persons were more than 15 years of age and came from a fairly representative segment of the Texas population. The only selected groups included were patients in the state mental hospitals and persons in a few of the state correctional institutions. These groups, however, should not result in any significant variation in a survey of pathologic chest conditions in supposedly well adults.

An attempt was made to follow up all persons whose chest photofluorograph report read as follows: "There is present a suspicious, presumably nontuberculous density or mass." In all these cases the physician designated by the person examined was written a personal letter in which he was urged to make an effort to identify the nature of the suspicious lesion and report back to us. A self-addressed stamped envelope was included to insure a maximum number of answers. In the survey of 611,665 persons suspicious mediastinal masses were found in 331, of whom 129 were followed up with at least a 14 by 17 inch roentgenogram.

Table 1 shows the number of tumors found by follow-up study. It is interesting to note that out of the 129 persons who had 14 by 17 inch roentgenograms, only 8 (6 per cent) proved to be absolutely negative. This result means that the mass photofluorography readings were fairly accurate as far as false positives were concerned. The table also gives the diagnoses made in the "definite tumor" group of 48 cases. The difficulty in diagnosing chest lesions by roentgen-ray evidence alone is emphasized by the 18 cases not diagnosed. In many instances, a biopsy or an exploratory thoracotomy must be done to establish a diagnosis.

TABLE 1.—*Results of Follow-Up Examinations after Discovery of Suspicious Chest Masses by Photofluorography.*

Diagnosis		No. Cases
Definite tumors		48
Undiagnosed tumor masses	18	
Bronchogenic carcinoma	12	
Substernal goiter	6	
Pulmonary and dermoid cyst	4	
Metastatic malignant lesions	4	
Sarcoma or Hodgkin's disease	2	
Breast tumor	1	
Bony traumatic tumor	1	
Other pathologic conditions		73
Undiagnosed pathologic masses	23	
Aortic aneurysms	15	
Pleural thickening (inflammatory)	10	
Old tuberculous lesions	5	
Cardiac enlargement	4	
Congenital anomalies	4	
Bronchopneumonia	3	
Lung abscess	2	
Pleural effusion	2	
Miscellaneous lesions (enlarged nodes, etc.)	5	
Negative		8
Total		129

Table 1 also breaks down the 73 presumably non-neoplastic conditions which were found. Here again are a large number of "undiagnosed pathologic masses," a designation which emphasizes once more the difficulty encountered when dealing with chest lesions. Although these 23 lesions are shown as "undiagnosed pathologic masses," some of them could well be neoplastic in origin. By the same token, some of the 18 "undiagnosed tumor masses" could well be non-neoplastic lesions.

It is interesting to speculate concerning the overall incidence of mediastinal pathologic conditions that this survey of 611,665 persons perhaps would have revealed had all the 331 suspicious cases been followed. It must be assumed, of course, that the results of follow-up of the remainder of the cases would have been comparable to the observations in the cases actually followed. Correcting the 331 cases of suspicious mediastinal tumor masses for the 6 per cent

false positives found in the cases actually followed up would mean that 310 (.05 per cent) of the persons surveyed perhaps had mediastinal masses of some kind. In a further breakdown of this figure, 187 (.03 per cent) would have had "other pathologic conditions" and 123 (.02 per cent) would have had "definite tumors."

SUMMARY AND CONCLUSION

A significant proportion of all tumors discovered in survey work carry a definite threat to the patient's health and life. Many of these lesions are in the early stage when symptoms are either absent or so mild that the life-threatening tumor is unsuspected by both the patient and his physician. The immediate identification of the lesion and the institution of proper treatment during this stage offers the patient his best chance to get well. Delays may either rob him of the opportunity to have curative treatment or introduce factors that complicate such treatment. The examiner should remember that an unexplained shadow in a chest roentgenogram may be carcinoma and should be considered carcinoma until proved otherwise, regardless of whether or not tuberculosis is present.

The policy of watchful waiting until the symptoms or extension forces the issue will not raise the percentage of salvages in either tuberculosis or cancer of the lungs. The true value of chest surveys will not be realized until a proper disposition of all uncovered lesions is made. The medical profession is faced not only with the obligation but also with the privilege of evaluating chest disease in advance of the time when most patients ask for help. The potentialities of this type of preventive medicine are great. The profession has within its grasp the power to overcome the plague of tuberculosis and to tear the label of certain death from cancer of the lungs.

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State Department of Health.

PRIMARY CARCINOMA OF THE LUNG IN TEXAS

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Galveston, Texas

THERE was a progressive increase in the number of cases of malignant disease reported in Texas from 1937 to 1947[16] (fig. 1). The number of cases of cancer of the respiratory tract progressively increased during this interval; however, their percentage of the total malignancies varied only between 4.2 and 7.3. In 1941 and 1947, 6.4 per cent of the total cases of malignancy were present in the respiratory tract. During this same period the number of cases of cancer of the stomach and duodenum increased. However, their percentage of occurrence apparently progressively decreased.

The number of cases of malignancy of the respiratory tract, as reported to the State Health Department in 1947 and 1948 from each district within the state, is shown in figure 2.[15]

Statistics based upon death certificates may be misleading since the clinical opinion frequently is not confirmed by other more specific methods of diagnosis. Data based upon autopsies would be ideal; however, it is difficult to establish whether such cases in specific hospitals are true "samples." The records of all cases brought to autopsy between 1930 and 1949 in the Department of Pathology of the University of Texas Medical Branch have been reviewed to determine the total number of malignancies and the frequency of the occurrence of cancer of the lung and stomach (table 1). Also included in table 1 are data from other autopsy series. The average frequency of cancer reported elsewhere in routine autopsies is 15.2 per cent, while in ours it is 16.0 per cent. The average frequency of cancer of the lung in recently reported routine autopsies in 1.14 per cent, ours is 1.45 per cent. The average frequency of cancer of the stomach in routine autopsies is 1.81 per cent; our percentage is 1.76. The average frequency of cancer of the lung in all malignant diseases is 9.76 per cent, while in ours it is 9.0 per cent. The average frequency of

From the Department of Pathology, University of Texas Medical Branch.
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cancer of the stomach in all malignancies is 14.7 per cent and in ours it is 11.0 per cent.

Statistical studies vary in the percentage of cancer of the lung in autopsies involving malignant diseases. The data collected by Miller and Jones[11] and Bonser[3] show that the percentage of cancer of the lung relative to all malignancies observed from 1920 to 1926 is only slightly less than it is today. It is questionable whether this difference is significant. Similar data collected before 1920 usually show less cancer of the lung. It appears to us that the frequency of cancer of the lung in relation to all malignant diseases as determined at autopsy has not changed significantly during the past twenty-five years. On the contrary, clinical data relative to the frequency of cancer of the lung show a significant increase during this interval.[12] Figure 3 shows the progressive increase in the number of cases of cancer of the lung as observed at autopsy between 1930 and 1949. This figure also shows that the total number of cases of malignancy has increased during this period. Therefore, the data from the Vital Statistics of Texas[16] and from the autopsies performed in the Department of Pathology at Galveston indicate that the number of cases of cancer of the lung is increasing. However, these data apparently do not show that there is an actual increase in the frequency of cancer of the lung when compared to other malignancies.

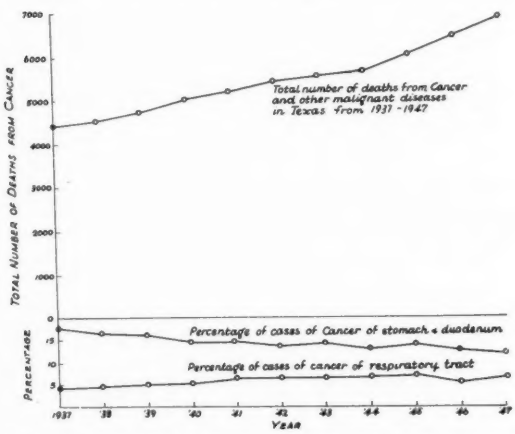
Total number of deaths from Cancer and other malignant diseases in Texas from 1937 - 1947
Percentage of cases of Cancer of stomach & duodenum
Percentage of cases of cancer of respiratory tract
TOTAL NUMBER OF DEATHS FROM CANCER
PERCENTAGE
YEAR

FIG. 1. Deaths from cancer and other malignant diseases in Texas from 1937 to 1947. There is a slight increase in the percentage of cancer of the respiratory tract during this interval although the total number of cases of malignancy has increased markedly.

In a further study the 79 cases originally reported as primary cancer of the lung in 5,437 consecutive autopsies were reviewed. Fifty-nine of these were accepted by us as primary bronchogenic neoplasms, giving a percentage of 1.08.

INCIDENCE

Age.—Since cancer of the lung is a neoplasm occurring primarily in adults, the number of cases found in persons 30 years of age and older was determined. Fifty-six occurred in 2,614 men and only 3 in 1,076 women. It is also of interest to note that 46 of the cases occurred in 1,635 white men and only 10 in 979 Negro men, a ratio of 1.67 to 1. Only 2 cases occurred in 489 white women and 1 in 587 Negro women. The frequency of cancer of the lung in all white men 30 years of age and older studied at autopsy is 2.8 per cent, Negro men 1.02 per cent, white women 0.4 per cent, and Negro women 0.17 per cent. The frequency of cancer of the lung in the different age groups is shown in table 2 for 436 cases, 369 of which were collected from the recent literature. The age distribution is the same as that given by Adler[2] in 1912. Cancer of the lung is a neoplasm that occurs more frequently in the sixth decade of life but does occur thereafter. It is significant to remember

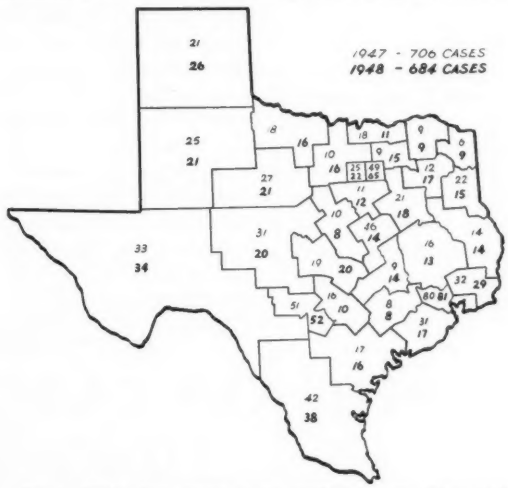

FIG. 2. Deaths from cancer of the respiratory tract during 1947 and 1948 in the Senatorial Districts of Texas.

TABLE 1.—*Frequency of Cancer of the Lung in 7 Autopsy Series.*

Investigator	No. Autopsies	All Cancer: No.	All Cancer: % of Autopsies	Cancer of Lung: No.	Cancer of Lung: % of Autopsies	Cancer of Lung: % of All Cancer	Cancer of Stomach: No.	Cancer of Stomach: % of Autopsies	Cancer of Stomach: % of All Cancer
Brines & Kenning	3,000	–	–	25	0.83	–	56	1.86	–
Koletsky	7,685	1,064	13.8	100	1.3	9.39	–	–	–
Frissell & Knox	3,659	588	16.0	39	1.06	6.63	–	–	–
D'Aunoy, Pearson, & Halpert	6,623	–	–	74	1.1	–	–	–	–
Willis	–	1,060	–	84	–	7.92	227	–	21.4
Abrams, Spiro, & Goldstein	–	1,000	–	160	–	16.0	119	–	11.9
Rigdon & Brindley	5,437	870	16.0	79	1.45	9.0	96	1.76	11.0

that the length of life has progressively increased during the past twenty-five years and the number of deaths from many infectious diseases has decreased during this time.

Sex.—There is a wide variation in the reported sex incidence of cancer of the lung.[3, 8, 12] Ochsner and DeBakey[12] collected 8,575 cases from the literature and found the ratio of males to females to be 3.74 to 1. In 285 cases of cancer of the lung studied at autopsy the sex ratio is 8.19 to 1.[4, 5, 7, 9] In our group of 59 cases of lung cancer in which autopsy was performed the sex ratio is 18.6 to 1 with the male predominating. It is difficult to conceive of such a wide variation in the sex ratio in cases of cancer of the lung. In our autopsy series of 5,437 cases there were 3,144 whites and 2,269 Negroes, a ratio of 1.38 to 1. There were 2,226 white men, 924 white women, 1,319 Negro men, and 939 Negro women. The race or sex was unknown in 29 cases. The proportion of males to females is important in any series when cancer of the lung is being studied.

Race.—A variation in the frequency of cancer of the lung in different nationalities is suggested from the study of 60 cases by Brines and Kenning.[4] The percentage of cases of cancer of the lung in the American was 36.7, Polish 28.3, Russian 8.3, Austrian 6.7, Jugoslav 6.7, and English, Scotch, Hungarian and German each 3.3 per cent. A variation in the proportion of cancer of the lung in the white and Negro has been observed by others.[13, 14] Ochsner, DeBakey, and Dixon,[13] in discussing the frequency of cancer of the lung and stomach, stated that "the ratio of white to Negro patients is about 2 to 3 for carcinoma of the stomach and perhaps not significantly different from that for all admissions; for carcinoma of the lung this ratio is practically reversed, being 2 to 1 in favor of the white race."

TABLE 2.—*Age of Patient with Carcinoma of Lung as Observed at Autopsy in 369 Cases Collected from Literature and 67 New Cases.*

Age	D'Aunoy, Pearson, & Halpert	Brines & Kenning	Kolesky	Frissell & Knox	Willis	Rigdon & Brindley	Total	%
10-19	–	–	–	1	–	–	1	0.22
20-29	1	1	–	3	1	–	6	1.37
30-39	4	10	9	5	5	2	35	8.02
40-49	13	18	30	6	15	15	97	22.2
50-59	33	27	32	17	31	24	164	37.6
60-69	19	10	19	14	22	18	102	23.3
70-79	4	2	6	–	9	7	28	6.4
80-89	–	–	1	–	1	1	3	0.68
Total	74	68	97	46	84	67	436	

ETIOLOGY

The distribution of the cases of cancer of the lung in the districts of Texas as reported to the State Health Department does not suggest to us any etiologic factor as playing a significant role in the production of pulmonary neoplasms. Furthermore, nothing significant as to the etiology is noted in our cases studied at autopsy. It has been suggested that the frequency of cancer of the lung would increase in the female as the result of smoking. There is no indication, however, that this has occurred in our autopsy series; after all, many women dying today have been smoking for twenty years. The time of onset of cancer of the lung in the men working in the radioactive mines in Central Europe is about twenty years from the time they start to work.[10]

Chronic pulmonary infections have been suggested as a possible predisposing factor for primary cancer of the lung. The role of tuberculosis in these cases has been discussed by Fried.[6] It is true that both tuberculosis and cancer may occur in the same lung; however, such does not indicate that there is a specific relationship between the two. Tuberculosis has been a frequent cause of death in the cases studied at autopsy during the past twenty years. This is especially true in the Negro race. As previously shown, there have been fewer cases of primary carcinoma of the lung in the Negro race than in the white in this autopsy series.

TABLE 3.—*Anatomic Site of Primary Tumors in 67 Cases of Carcinoma of Lungs.*

	Upper Lobe	Middle Lobe	Lower Lobe	Not Stated	Total
Right lung	10	3	8	16	37
Left lung	12	–	6	10	28
Not stated	–	–	–	2	2

ANATOMIC SITE

The anatomic site of the tumor in the 67 cases of primary cancer of the lung is shown in table 3. This is essentially the same as has been observed by others.[5, 7, 13] The histologic classification of primary carcinoma of the lung is shown in table 4. The frequency of these different types is similar to that given by others. It should be emphasized that a wide variety of histologic classifications may be found in the literature. Willis'[17] statement is pertinent with reference to the microscopic structure of these tumors: "There is only one entity *carcinoma of the lung.*" These tumors show various structural combinations and great pleomorphism is possible in a single tumor.

TABLE 4.—*Histologic Classification of 67 Cases of Primary Carcinoma of Lungs.*

Classification	No. Cases
Squamous cell	45
Adenocarcinoma	4
Undifferentiated	18*

*A majority of the early cases were squamous. The cases of undifferentiated carcinoma no doubt originally were classified other than of the lung and, therefore, would not be included in this series.

In considering data based upon the clinical, roentgenologic, and biopsy diagnosis of primary carcinoma

of the lung, it should be remembered that primary tumors originating elsewhere in the body frequently metastasize to the mediastinal lymph nodes and to the lungs. A single metastasis located in the hilar region may be difficult to differentiate from a primary pulmonary tumor. Although we usually think of multiple metastases in the lungs, located away from the hilar region and frequently bilateral, there is no reason why a metastatic tumor may not be single and be located near the hilus. Abrams and associates[1] found the mediastinal nodes involved in 47 per cent of their cases of primary carcinoma of the kidney, 34 per cent of the cases of carcinoma of the ovary, 22 per cent of the cases of carcinoma of the pancreas, 20 per cent of the cases of carcinoma of the rectum, and 15.3 per cent of the cases of carcinoma of the stomach. Sometimes in clinical studies the primary lesion is difficult to demonstrate. With carcinoma in the mediastinal lymph nodes extension into the larger bronchi may occur, producing bronchial obstruction. A biopsy specimen from such an area would show malignant epithelial cells. Since primary bronchogenic carcinoma normally is so pleomorphic, it would be sometimes impossible to determine the origin of the primary growth. In the review of the cases in which autopsy was performed this problem presented itself on several occasions, and it accounts for some of the cases we have classified as "questionable" in this study.

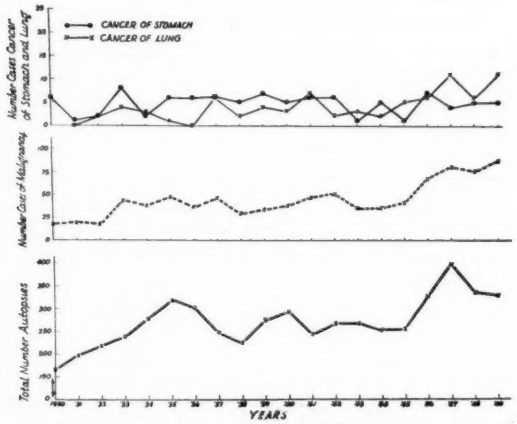

FIG. 3. Graph showing autopsies performed in the Department of Pathology, University of Texas Medical Branch, Galveston, between 1930 and 1949. Note that the number of cases of malignancy has increased progressively during the interval. There has been also a corresponding increase in the number of cases of cancer of the lung during this twenty year period.

The anatomic location of the metastases in the cases of primary carcinoma of the lung is given in table 5. A wide distribution of the metastases is well known in primary carcinoma of the lung. The distribution here is similar to that observed by Abrams and others[1] in 165 cases recently studied. It is of interest to find the pericardium infiltrated in 30 per cent of our cases. Such would be anticipated, however, from the anatomic location of the original tumor and the frequent involvement of the mediastinal lymph nodes. The walls of the larger blood vessels in the mediastinum often are infiltrated with tumor. This serves as an excellent focus for the vascular spread of neoplastic cells to the lungs.

TABLE 5.—*Location of Metastases in 67 Cases of Primary Carcinoma of Lung.*

Metastasis to viscera:			
Liver	20	Bones	11
Adrenal	19	Brain	7*
Lung	15	Pancreas	5
Kidney	13	Spleen	2
Metastasis to lymph nodes:†			
Hilar	51		
Retroperitoneal	12		
Peripancreatic	7		
Fluid in serous cavities:			
Right pleural	27		
Left pleural	25		
Pericardial	21		
Abdominal	8		
Extension of tumor to pericardium: 25			

*Cranial cavity not examined in all cases.
†Cervical, supraclavicular, and axillary sometimes.

CONCLUSION

From this study of primary carcinoma of the lung at autopsy there is insufficient evidence to prove that the frequency of this neoplasm in all malignancies has increased during the past twenty years. There is no evidence to indicate that cancer of the lung is increasing in the female within this period. One of the factors contributing to the confusion relative to the frequency of cancer of the lung is the variation in the clinical data and the difference in these data and those obtained from autopsies. A second factor contributing to this problem is the failure to separate data referable to these tumors in the white and the Negro patient. In autopsy series the frequency of cancer of the lungs may be established more readily by determining the percentage of these tumors in all neoplasms rather than only their incidence in routine autopsies.

This study was made possible only through the untiring efforts of Mrs. Helen Kirchoff. We wish to acknowledge the assistance given by Miss Eleanor McDonald, statistician at the M. D. Anderson Hospital in Houston.

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ABSTRACT OF DISCUSSION

DR. R. H. CHAPPELL, Texarkana: Two diseases which are gaining in importance with each passing day were omitted, perhaps purposely, from Dr. Rigdon and Dr. Brindley's paper. The first is pulmonary adenomatosis, also known as alveolar cell carcinoma and as the human equivalent of jagziekte, the driving disease of sheep. The second is bronchial adenoma. The essayists quoted Willis as saying that there is only one disease entity of lung carcinoma and it may be in one of three forms, squamous cell carcinoma, adenocarcinoma, or undifferentiated carcinoma. I think, in the light of knowledge of these two diseases which has been brought out in the last few years, we must consider this statement seriously.

The disease pulmonary adenomatosis was declared to be cancer at the American Cancer Society in Memphis in 1949. It is of multicentric origin, does not involve lymph nodes, is not bronchogenic, and is equally common in the two sexes. In my opinion these three features distinguish it sufficiently to make it a disease entity distinct from the forms of lung cancer which are customarily seen.

I think bronchial adenoma has not been accepted definitely by all authorities as carcinoma, but it is frequently referred to as such. It occurs customarily in young people, I think slightly more frequently in females than in males. I have not heard of a case resulting in death when the airways were opened. I have not heard of its metastasizing. It is my opinion from experience with only 1 case that it is not carcinoma, but if it is, as some authorities insist, here is another disease entity sufficiently different from that which the essayists have described to be classed as a separate disease.

The racial preference may be partially explained on one of the points which has been mentioned: Tuberculosis is considerably more common in the Negro but cancer of the lung is more common in the white. The high tuberculosis death rate in the Negro helps to lower his life expectancy to about 50 years, whereas that of the white American is 63 years or thereabouts. This means that most Negroes die before they get to the lung cancer age.

I am glad that the essayists used autopsy figures rather than death certificate figures. The latter are subject to many modifications.

IDIOPATHIC SPONTANEOUS PNEUMOTHORAX

An Etiologic Consideration

ROBERT A. WISE, M.D.,* Houston, Texas

SPONTANEOUS pneumothorax occurs commonly in large hospitals, and most physicians in private practice encounter several cases each year. Idiopathic spontaneous pneumothorax may be defined as air in the pleural spaces which occurs without demonstrable pathologic conditions in chest or lung. Another closely related term is spontaneous mediastinal emphysema, which is air in the mediastinal space occurring without obvious trauma or demonstrable lung or chest wall disease. Both conditions enter into a consideration of the etiology of spontaneous pneumothorax.

Until about ten or fifteen years ago, most authorities considered spontaneous pneumothorax as a manifestation of tuberculosis. This idea grew out of autopsy statistics. For example, a commonly used reference book[4] on diseases of the chest for which surgery is performed stated, "Biach has reported that out of 918 cases of spontaneous pneumothorax, 715 of them were due to tuberculosis."

Records of the Veterans Administration Hospital, Temple, Texas, showed that spontaneous pneumothorax was diagnosed 8 times in a total of 4,959 admissions; at the Veterans Administration Hospital, Houston, Texas, 6 cases were found in the first 4,000, or about once in 650 admissions. In none of these cases was it possible to find disease of the lung. Many other cases of spontaneous pneumothorax due to

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known causes, such as tuberculosis, carcinoma of the lung, penetrating and nonpenetrating trauma to the chest wall, lung abscess, and empyema, were observed.

SPONTANEOUS PNEUMOTHORAX

Idiopathic spontaneous pneumothorax occurs in previously healthy patients in whom the tuberculin test is negative in the same or less percentage than in the general population. Most authorities believe that pneumothorax occurs about five times as frequently in males as females. However, Dickie[2] has reported the occurrence of an equal rate in a university population. Flint as early as 1886 reported 2 attacks of spontaneous pneumothorax in the same patient with recovery. Since then repeated attacks commonly have been reported. Rarely it is bilaterally spontaneous, but most often it is unilateral; if it recurs, it may recur on either side. One patient of Sale had as many as 11 recurrences in six years.

Individual attacks usually stop without any specific treatment within two months. However, Whitney reported 1 patient who went seven years without recovery. Ordinarily a large amount of fluid does not develop with spontaneous pneumothorax, but small to moderate amounts are common and resorb without aspiration; occasionally the pneumothorax is accompanied by hemorrhage.

Leach[7] reported on 126 patients with spontaneous pneumothorax from the records of an Air Force Training Command. Analysis of this group of cases, which included 129 attacks, is shown in table 1.

TABLE 1.—*Analysis of 129 Attacks of Spontaneous Pneumothorax.*

Onset:	gradual 17.8%; sudden 69.8%; unknown 12.4%
Initial Symptoms:	none or mild 63.5%; moderate 5.1%; severe 31.4%
Significant Past History:	none 59.0%; recent or concomitant upper respiratory 16.3%; miscellaneous 24.7%
Physical Activity at Onset:	rest 38.8%; mild or unstated 50.4%; extreme 10.8%
Type:	closed 98.5%; valvular 1.5%
Site:	right 58.9%; left 38.8%; bilateral 0.7%; unstated 1.6%
Average Days to Reexpansion:	less than 50% collapse, 19.5; greater than 50% collapse, 48.4; both groups, 31.0
Recurrence:	one recurrence, 3 out of 129; two recurrences, 4 out of 129
Return to Duty:	3 out of 4 patients

[Compiled from data in Leach, J. E.: Pneumothorax in Young Adult Males; Descriptive Statistics in 126 Cases, Arch. Int. Med. 76:264-268 (Nov.-Dec.) 1945.]

Another analysis of this problem, showing other relationships, was undertaken by Schneider and Reissman[15] working in an induction center. They reported 100 unselected cases in inductees, aged 18 to 38. They found a verified history of the disease once in every 500 men examined at that station. Most of the men who had had previous pulmonary collapse were unduly alarmed about it, having been condemned to a life of caution and sedentary occupation, and had developed functional symptoms of a conversion hysteria as an overlay on their original condition. Schneider and Reissman believed that only a single recurrence will happen in the vast majority of cases. More than two recurrences is extremely uncommon. It must be emphasized that chronic lung disease is not a sequel. Pneumothorax occurred more commonly in the third decade of life; 34 per cent occurred between the ages of 21 and 25 years, and 29 per cent between the ages of 25 and 30 years with an equal amount on both sides of these age periods. There were 19 recurrences in this series. Most recurrences appeared within the first year; 2 recurrences were noted after four years.

Schneider and Reissman expressed the belief that spontaneous pneumothorax is more frequent among whites than Negroes and offered as an explanation

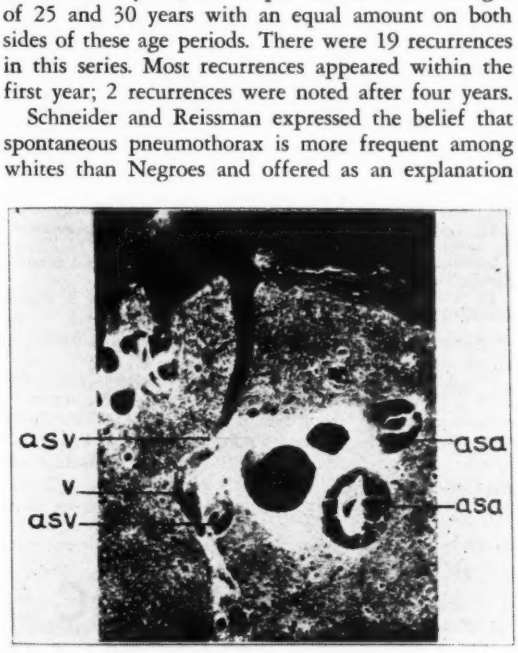

FIG. 1. Photograph of a section of lung of a cat dying of experimental overinflation and mediastinal emphysema; *asa* is the air space about an artery; *asv* is the air space about a vein. [After Macklin, C. C.: Transport of Air along Sheaths of Pneumonic Blood Vessels from Alveoli to Mediastinum; Clinical Implications, Arch. Int. Med. 64:913-926 (Nov.) 1939.]

that the Negro is less sensitive to discomfort. However, I believe a more probable explanation would be that the Negro is usually poor and does not readily seek medical aid; if he does, roentgenograms are not usually ordered except in unusual circumstances. It is noted both in Schneider and Reissman's series and in Leach's series that the condition is not associated with severe exercise as often as it occurs in a resting state or with mild exercise. My experience supports this observation.

MEDIASTINAL EMPHYSEMA

Spontaneous mediastinal emphysema was first given attention in 1934 by Hamman in his report of 3 cases. In 1938 he had increased this series to 7 cases. Since that time other authors, including Lintz,[8] Adcock,[1] Miller,[11] Morey and Sosman,[13] and Dickie[2] have reported single cases or small series of cases so that approximately 15 to 30 cases have been reported in

American medical literature in the past few years. Many of these cases have been reported as occurring in physicians and those associated closely with hospital work.

A short history of Miller's case[11] in a Cincinnati General Hospital resident is given as a typical description of mediastinal emphysema.

A 27 year old physician, in making rounds, was suddenly seized by excruciating pain in the right upper region of the chest. He became dizzy and weak and had a sense of impending disaster. The first thought in the resident's mind was that he had a dissecting aneurysm. The pain then became substernal in the lower left region of the chest. Two days later, he developed left precordial pain. He heard a loud clicking noise in his chest, synchronous with his heart beat. A thrill was present; his wife was able to hear the noise 6 feet away. The pain increased on deep expiration and decreased on deep inspiration; lying on the right side made the pain less, rolling on the left side made it worse, and it radiated to the left shoulder and down the left arm along the course of the ulnar nerve. Cardiac dullness was completely obliterated. A roentgenogram revealed that the patient also had a left pneumothorax.

Scott,[16] Sosman, and others observed the close resemblance in the symptomatology of mediastinal emphysema and coronary occlusion after Hamman[5] first pointed out this necessary differential diagnosis.

The sound of air around the pericardium is a peculiar, yet typical, noise; it is synchronous with the heart beat; it varies with position, usually being loudest with the patient on his left side. The sound has been described as like the noise that one hears on the telephone when someone else moves the lever up and down. In my experience, as well as others, it corresponds more closely to the crumpling of cellophane; however, it is the same sound obtained if one presses the stethoscope into a subcutaneous area of emphysema. These patients also may develop marked cyanosis. Emphysema of the subcutaneous tissues occurs principally above the clavicle, but it may spread down to the scrotum and retroperitoneal organs and tissues. Marked dyspnea is often present. The pain may be excruciating, and to the patient the situation is alarming. The air may be outlined by roentgen ray as being present in the mediastinum. The patient himself often hears this noise. One patient likened it to grinding of gears.

In the 23 cases of mediastinal emphysema in the literature reviewed in preparing this paper, 13 patients also had a pneumothorax. Two points in regard to mediastinal emphysema should be emphasized: (1) At the onset there is usually severe pain and distress which demands that coronary occlusion or dissecting aneurysm of the aorta be considered. However, after a few hours, most of these patients are comfortable. (2) In many cases of spontaneous pneumothorax in which mediastinal emphysema has not been recognized previously the symptoms also are severe and similar to those described by patients with mediastinal emphysema.

EXPERIMENT

Macklin[10] reported in 1939 his experiments on adult cats. After anesthesia, a catheter was placed in the right lower bronchus and air was injected under pressure graded up to 12 cm. of mercury. He was able to demonstrate that the air collected in bubbles and traveled in ever increasing number and size bubbles along pulmonary arteries and veins back to the hilus, where it entered the mediastinum, compressing the great vessels at the lung roots and compressing the pericardial tissues with the squeezing of the coronary arteries and anoxemia of the heart muscles. After the

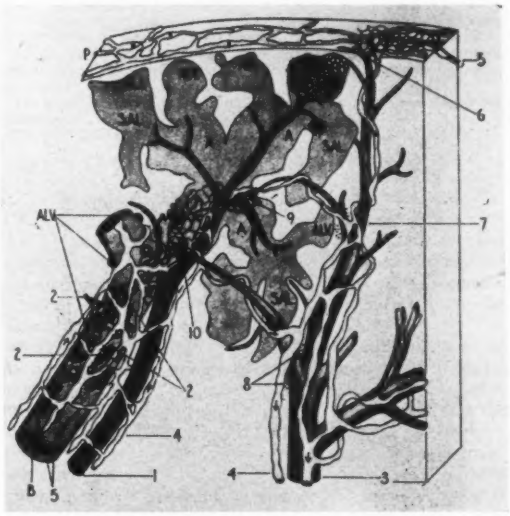

FIG. 2. General scheme of a primary lobule of the lung in which (*B*) the bronchial tree, (*1*) the pulmonary artery and (*2*) its branches, (*3*) the pulmonary vein, (*4*) the lymphatics, (*5*) bronchial arteries, (*6*) a radicle of the pulmonary vein, (*P*) the pleura, and (*7, 8, 9, 10*) lymphoid tissue are shown. The subdivision of (*B*) a respiratory bronchiole into two alveolar ducts and (*A*) the atria, (*S.AL.*) alveolar sacs, and (*ALV.*) alveoli of one of these ducts are represented. (After Miller, W. S.: The Lung, ed. 2, Springfield, Ill., Charles C. Thomas, 1947, p. 75.)

air entered the mediastinal tissues, it might dissect inferiorly into the retroperitoneal spaces and superiorly into the neck. Often it ruptured from the mediastinum into the pleura, either unilaterally or bilaterally, producing combined pneumomediastinum and pneumothorax.

Macklin believed that a similar condition could occur in man to explain both conditions. The air does not travel to the hilus peribronchially, but perivascularly, as illustrated in figure 1, and it is the pressure of the trapped air on pulmonary vessels that accounts for the severity of the signs in spontaneous mediastinal emphysema. Macklin noted that many patients

with mediastinal emphysema give a history first of lateral chest pain on one side or the other and then of precordial pain. He believed that the lateral phase of the pain occurs when the air is still in the interstitial tissue; that the precordial and substernal pain results from the accumulation of air in the mediastinum; and that when this air ruptures the mediastinum to form a pneumothorax, pressure symptoms are relieved. In this way nature heals the lesion both

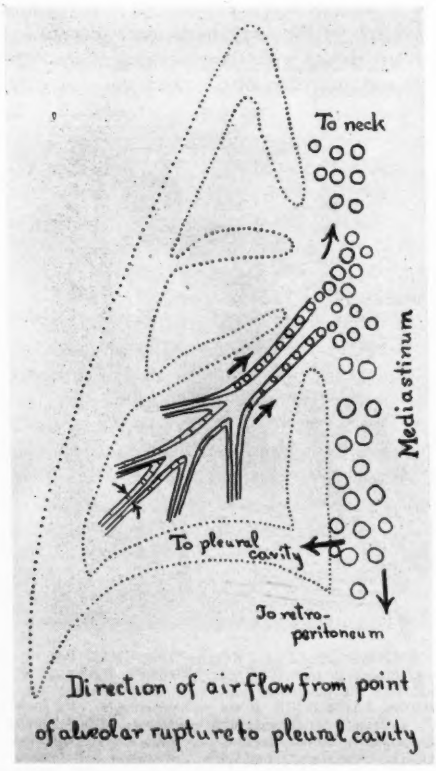
To neck
Mediastinum
To pleural cavity
To retro-peritoneum
Direction of air flow from point of alveolar rupture to pleural cavity

FIG. 3. A diagram showing the pathway of air from the air spaces of the lung to the mediastinum and beyond, via the perivascular sheaths of the lung. Only the artery is represented. [After Macklin, C. C.: Pneumothorax with Massive Collapse from Experimental Local Over-Inflation of the Lung Substance, Canad. M.A.J. *36*:414-420 (April) 1937.]

by collapsing the lung and by relieving the pressure on the mediastinal and coronary vessels. In his animals he did not demonstrate rupture of the single alveolus, but of many alveoli in the overdistended area. Macklin postulated that certain people have a constitutional weakness for this condition, and there are instances in which several members of the same family have had the condition.

In another article, Macklin[9] reported that he used pressures from 2 to 22 cm. of mercury and that the time required to rupture the mediastinum and produce a pneumothorax was proportional to the height of pressure used. Macklin[9] did other experiments in which he injected the air directly into the mediastinum. Here he observed the swelling in the retrocardiac area and then the air breaking into the pleura causing a pneumothorax. By introducing a pneumothorax first, he was unable to produce a mediastinal emphysema. However, the reverse was common. Also, after the rupture of the mediastinum producing pneumothorax, it was difficult to find the rupture in the mediastinal pleura. (An illustration of the terminal bronchiolar anatomy is reproduced in figure 2.)

Macklin's theory of the mechanism of spontaneous pneumothorax (fig. 3) is that first there is an atelectasis or some form of partial bronchial obstruction which allows the air to enter during inspiration but does not allow it to escape during expiration, thus causing a local area of hyperinflation of the lung. The resultant pressure gradient in this area allows air to enter the perivascular tissues. The air bubbles rupture through the alveolus, collect, and migrate in the perivascular spaces.

In another experiment conducted by Macklin[9] the lungs were inflated and mediastinal emphysema with subsequent pneumothorax occurred. The lungs then

FIG. 4. Photograph of a section of lung from a year old child dying of consequences of air dissecting along pulmonary vessels to the hilum. The vessel in the center is an artery surrounded by air. Note the large air space around several other vessels in the photograph. [After Fisher, J. H., and Macklin, C. C.: Pulmonic Interstitial and Mediastinal Emphysema; Report of Fatal Case in Which Emphysema Occurred in Child as Result of Aspiration of Peanut Fragments, Am. J. Dis. Child. *60*:102-105 (July) 1940.]

were submerged and reinflated with air and no rupture could be noted in the periphery of the lung.

Macklin and Fisher[3] reported a case of a 22 month old girl who aspirated a peanut three days prior to admission to the hospital. She arrived in desperate respiratory distress and died a short time thereafter. At autopsy, bubbles of air were observed in the mediastinum and around the heart; the lung, after proper fixation, was sectioned and air was demonstrated along the pulmonary vessels. There was a tract of air dissecting to the subpleural space (fig. 4).

Rupture of the alveolus with interstitial emphysema and so forth as has been outlined previously, was present when mediastinal emphysema occurred. It choked off the blood supply to and from the lungs, causing acute dilatation of the right side of the heart and death. This mechanism in this baby is the same as Macklin observed in the cats whose lungs were overinflated.

DISCUSSION

Since the idea of a common etiology for pneumothorax and mediastinal emphysema has been suggested, I have made an effort to obtain more detailed histories which might shed light on this possible relationship. The result often has been a story compatible with mediastinal emphysema prior to pneumothorax. Many reported cases indicate that the symptoms were more severe and also more related to the mediastinum than could be expected from the simple presence of air in the pleural space. Induced pneumothorax usually is not painful and, if painful, is of the pleuritic type usually located laterally and never constricting, squeezing, or substernal as spontaneous pneumothorax may be. The theory of a ruptured bullous on the periphery of the lung as the cause of spontaneous pneumothorax has recently been presented by Rottenberg and Golden.[14] However, spontaneous pneumothorax is not common in persons with obvious bullous emphysema and is not common in the age group in which bullous emphysema occurs. Another point is that to rupture the peripheral pleura in lungs studied at autopsy requires 200 mg. of mercury pressure, a pressure usually well above that which the average person ever puts on his alveolar wall.

The occurrence of a bilateral simultaneous pneumothorax and also the presence of the initial pain on the side of the chest opposite to the pneumothorax to my mind cannot be explained by any theory other than Macklin's.

SUMMARY

The resemblance of symptoms of spontaneous pneumothorax and mediastinal emphysema is discussed.

Experimental work in relation to mediastinal emphysema is presented.

Possibility that the two are the result of the same etiologic process is discussed.

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ABSTRACT OF DISCUSSION

DR. GEORGE R. HODELL, Houston: It is timely that Dr. Wise brings attention again to this common clinical entity. We might well remember his detailing of the mechanism of mediastinal emphysema with or without pneumothorax. It is not uncommon that the pain of mediastinal emphysema, in the absence of pneumothorax, may be mistaken for the anginal symptoms of coronary disease.

I think, however, that some emphasis should be placed on the management of spontaneous pneumothorax, whether it be idiopathic or a complication of previously existing pulmonary disease. In spite of the fact that in most instances the pneumothorax is idiopathic, recovery is prompt and without specific care. In fact, I believe it may be agreed that many such pneumothoraces occur and reexpand as healed without a diagnosis even being made—the patient complaining only of a brief pleural pain. It is unfortunate, however, that each year there are several unnecessary deaths in most communities because of a failure to recognize the intimate relationship of cardiorespiratory physiology.

It must be remembered that a one-way valve commonly results when a pneumothorax occurs and that when the lung collapses, the defect may open to admit air to the pleural space during inspiration and on exhalation close to trap the air within the pleural space. When such a situation develops and does not promptly cease, a positive pressure soon builds up in the pleural space. At this point, if the intrapleural pressure is not relieved by removal of air, the patient will expire promptly when the intrapleural pressure equals the pressure within the auricles of the heart. It is simple enough to relieve the pressure by aspiration of air, and as is frequently necessary, continuous decompression can be maintained by fastening a needle or catheter into the chest wall and attaching a rubber tube connection to a water seal at the side of the bed. However, even at this point it is not uncommon to defeat the whole procedure of decompression by dropping the rubber tube to the bottom of a deep water jug or milk bottle. It is important that when continuous decompression is instituted by this simple device, the tip of the tube be barely submerged in the liquid because the column of water that the air pressure must overcome must be as short as possible.

SUBPHRENIC ABSCESS

W. M. PALM, M.D., Houston, Texas

A SUBPHRENIC abscess occurs in the space bounded below by the transverse colon and transverse mesocolon and above by the diaphragm. There are six intraperitoneal spaces. The coronary and falciform ligaments with the ligament of the ductus venosus divide the subphrenic space into right and left areas, and the liver divides it into suprahepatic and infrahepatic areas. The right suprahepatic area is further subdivided by the two leaves of the right lateral ligament into right posterior and right anterior suprahepatic areas. The left infrahepatic area is subdivided by the stomach and gastrohepatic ligament into anterior and posterior areas, the posterior corresponding to the lesser omental cavity. The extraperitoneal area includes the space between the two leaves of the right lateral ligament over the bare area of the liver and the extraperitoneal areas in relation to the anterior and posterior abdominal walls (fig. 1).

Subphrenic abscesses occur more frequently in the intraperitoneal than in the extraperitoneal spaces. Ochsner, Graves, and DeBakey reported the right posterior suprahepatic space to be most frequently involved in adults (33.7 per cent in their collected cases; 55.7 per cent in Ochsner and DeBakey's own cases). Ladd observed the right anterior suprahepatic space to be most commonly involved in children. The abscess may start in one subphrenic space, extend to another, and subside in the first while persisting in the latter. Ochsner and Graves reviewed the world's literature and collected 3,372 cases in 1933, with 50 cases from New Orleans hospitals. In 1938 Ochsner and DeBakey reviewed 3,608 cases of which 25 were personal cases. They concluded that only 30 per cent of subphrenic infections proceed to suppuration.

ETIOLOGY

A subphrenic abscess may form from (1) direct extension from the peritoneum or contiguous organs, (2) distant extension, (3) rupture of hepatic abscess or thoracic empyema, (4) circulatory spread—arterial, venous, or lymphatic, and (5) direct implantation by injury to an anatomically related organ.

In Ochsner and Graves's collected series, the appendix was responsible in 30.6 per cent of the cases, the stomach and duodenum in 29.1 per cent (especially ruptured gastric ulcers), and infections of the liver and biliary passages in 12.1 per cent, making from 65 to 75 per cent fall into this group of sources of subphrenic infection. Hochberg believed that the appendix is particularly likely to cause a subphrenic abscess if it is retrocecal, associated with an abscess, or beneath the liver; if a necrotic piece of appendix or a fecolith is left; or if part of the peritoneum is pulled away with the appendix. Ochsner reported an incidence of 0.9 per cent of subphrenic abscess in a series of 15,000 collected cases of appendicitis. Neuhoff observed 972 cases of acute appendicitis with an incidence of 1.5 per cent. Similar observations have been made by Lee, Clendening, McNamee, and others. Ladd and Swan noted the incidence to be less in children; in 860 cases of acute appendicitis in children the incidence was only 0.3 per cent.

Several factors are thought to contribute to the spread of suppurative infection in the abdomen to the subphrenic space. There is a rich lymph flow toward the subphrenic space; the infection concentrates there, extends into the thorax, and contributes to the early pulmonary symptoms associated with the condition. When the patient is supine, portions of the subphrenic space are lower than the abdominal gutters, permitting gravity drainage of purulent material upward. The pumping action of the diaphragm which creates a negative pressure in the subphrenic area

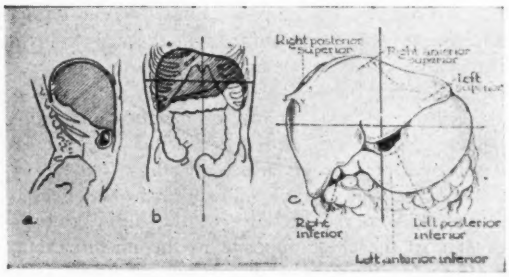

FIG. 1. Diagrams showing the extent and subdivisions of the subphrenic space. [After Ochsner, A., and DeBakey, M.: Liver and Subphrenic Space, in Cole, W. H. (editor): Operative Technic in General Surgery, New York, Appleton-Century-Crofts, Inc., 1949, pp. 536-544.]

facilitates this spread upward. The venous return, such as by the portal vein, carries infection in this direction. Extension upward also may be by way of the extraperitoneal cellular material.

In addition to the more common causes, subphrenic abscesses have been reported after primary closure for pilonidal sinus operation (Hurwitt), fractures of the ribs and pelvis (Fifield and Love), rupture of echinococcus cyst of liver, carbuncle of the neck, actinomycosis of the appendix and elsewhere (Ochsner and Graves), hydronephrosis and renal calculus, cholelithiasis and biliary fistula, cholelithiasis and ruptured

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gallbladder, perforation of the esophagus, hysterectomy, stab wounds, renal tuberculosis complicated by perirenal abscess, diverticulitis and herniation of the diaphragm, herniotomy, pyelitis of pregnancy, and pancreatitis. They have followed ulcers of the rectum and hordeola with sepsis and have occurred secondary to various lung conditions. Ludlow reported 142 cases of amebic abscess of the liver with rupture to form a subphrenic abscess in 9 per cent of the cases. Ochsner and DeBakey reported 73 cases with 2.7 per cent ruptured. Overholt reported a case unobserved during pregnancy causing death of the mother ten days after labor and delivery with forceps. There have been a sprinkling of cases after splenectomy; Gainard reported 2 such cases as did Neuhoff. Blakemore mentioned 3 cases after splenorenal shunt for portal hypertension. Ladd and Swan included otitis media, trauma, and intra-abdominal hemorrhage with possible rupture of the alimentary tract among the causative factors in their series. Whipple mentioned one of his personal cases occurring in a patient who had an interval cholecystectomy which was uncomplicated and so easy and clean that drainage was not used. Another of his cases followed excision of a fecal fistula complicating a right colon resection. Subphrenic abscesses have been blood borne from osteomyelitis and furuncles.

The common causative organisms are streptococci, staphylococci, the colon bacilli, and, Ireland has added, not infrequently ameba. Scott reported the gonoccus organism as the causative organism in 2 cases and reported 8 from the literature. Other organisms are less frequently responsible.

Gatewood believed that subphrenic abscess should be considered in any patient not doing well after an abdominal operation, even though surgery was performed months previously. Musser was of the opinion that in a patient who has had suppurative appendicitis and who develops fever, an elevated white blood cell count, and constitutional symptoms, it is safe to assume the subphrenic space is involved. Ochsner expressed similar views.

The incidence is three times more common in men. The highest age incidence, 32 per cent, is in the fourth decade. While the condition is less common in children, Ladd and Swan reported a case in a newborn infant with septic thrombosis of the umbilical vein. Morris and Landers reported on a patient aged 15 months. Ladd and Swan reported 14 patients less than 11 years old, 6 of whom were younger than 2 years of age. Ireland noted that the condition was rare in children and reported 6 patients whose ages were from 14 months to 12 years.

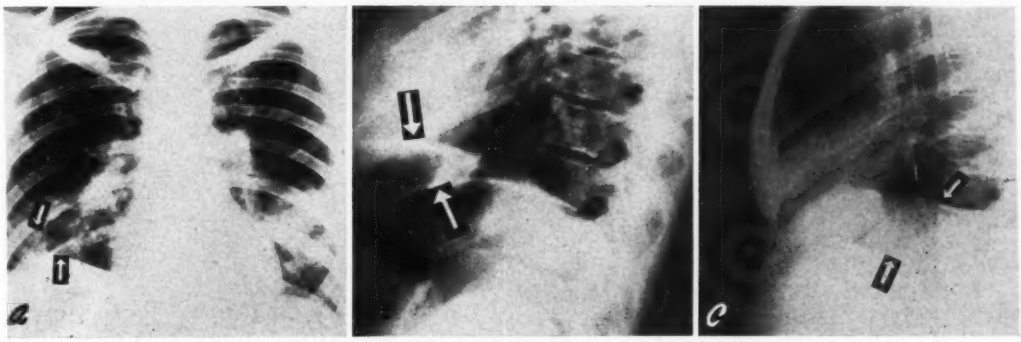

FIG. 2. A high diaphragm (fixed on fluoroscopy) is the earliest and almost constant finding. Lateral and oblique views may demonstrate an elevated diaphragm not seen on anteroposterior or posteroanterior views.

a. Roentgenogram of a 29 year old white man who developed clinical evidence of subphrenic abscess eight days after the difficult removal of retrocecal appendix. Twelve days postoperatively roentgenograms of the lung showed evidence of subphrenic abscess. This roentgenogram taken twenty-seven days later shows less parenchymal involvement (indicated by upper arrow) but the right half of the diaphragm is greatly elevated (indicated by lower arrow). The roentgenologist reported the diagnosis to be pneumonia.

b. This lateral roentgenogram of the chest shows the normal relationship of the leaves of the diaphragm.

c. Roentgenogram of a 19 year old white woman who had had an appendectomy ten weeks earlier on a prior admission, with the onset of illness occurring shortly thereafter. The roentgenologist reported the high, fixed diaphragm. The clinician, aware of the abscess in the right upper quadrant, thought it possibly associated with pulmonary disease such as tuberculosis.

DIAGNOSIS

According to Barnard and Whipple, the onset may be sudden and abrupt or insidious. It may follow laparotomy for intraperitoneal suppurative process. Depending on the type of onset, the symptoms may be vague, with malaise, fatigue, loss of appetite, and pallor, accompanied by a dull ache in the region of the abscess. As the condition progresses, the temperature and pulse become elevated and fluctuant. The patient has chills and sweats profusely. Nausea and vomiting usually appear. The patient loses weight and complains of pain in the region of the abscess and the corresponding shoulder and he occasionally hiccoughs or belches. There may be jaundice and

severe anemia. There is a leukocytosis with increase in the polymorphonuclear leukocytes. The patient is acutely ill with a hectic flush, warm skin, and a short hacking cough in some cases. He will have an anxious expression and is apt to have dyspnea and restriction of breathing on one side; he tends to favor the affected side by lying on it. There may be edema resulting from infection and discoloration of the skin. The region usually is tender to touch and doughy. Hochberg occasionally has observed a clicking quality to the second heart sound in the region of the apex.

Spasm of the quadratus lumborum muscle on the affected side may produce scoliosis in the lumbar area. About 30 per cent of Hochberg's cases had symptoms referable to the lumbar region and in 25 per cent of his cases the first symptoms were in that area. Tenderness along the costal margin or over the twelfth rib as well as tenderness over the involved portion may be an important finding. Intercostal spaces may be retracted, bulging and edematous, or widened. The lower costal structures may flare. In involvement of the right posterior suprahepatic space, pain when present is likely to be referred to the lumbar region. There may be a sense of fullness with the abscess in any location.

The diaphragm is elevated and fixed early. Dullness in the area of the liver in abscesses on the right side is increased and the liver may be displaced downward. The liver edge may be rounded if there is much hepatitis. Muscle spasm of the right upper abdominal quadrant may be noted; a palpable mass was present in about 60 per cent of some series. There may or may not be diminished breath sounds over the overlying lung base. Percussive sounds will vary and at times may vary in stair-step fashion as the examination is extended downward from normal lung tissue, over a layer of compressed lung, then over pleural effusion, in some cases over gas beneath the diaphragm, then over fluid, and then over the liver, with liver flatness extending lower than normal. There may be a friction rub. According to Tuft, the heart may be displaced upward but not laterally. Bulging of the side or epigastrium is more frequently seen in late than in early cases; it may be anterior, lateral, or posterior.

Often it is not possible to tell clinically in which subphrenic space the abscess lies, whereas in an occasional case the subphrenic space involved is obvious.

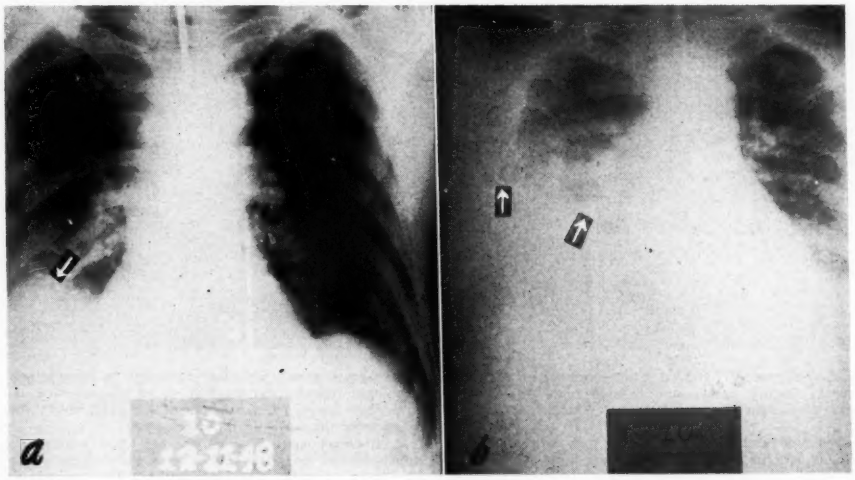

FIG. 3. Infrequent or late roentgenograms may permit the diagnosis to become obscured. Note the rapid changes occurring in three days in this patient.

a. Roentgenogram of a white man in his early fifties who had a right colon resection. This roentgenogram made the sixth postoperative day shows the right portion of the diaphragm elevated with infiltration of overlying lung base. The diagnosis was reported by the roentgenologist as being pneumonia, although the possibility of subphrenic abscess was considered.

b. Another roentgenogram of the patient in *a* showing the pathologic lesions of the lung to be more extensive and bilateral. The arrows indicate the right leaf of the diaphragm which is elevated. The abscess developed first on the right side, then on the left.

Neuhoff has noted that the diagnosis of left subphrenic abscess is more difficult and may be impossible. Although the right lobe of the liver tends to lock up the right subphrenic abscess, on the left the surrounding organs are readily displaced by an expanding suppurative lesion. Thus, elevation of the left section of the diaphragm is not as constant nor noticeable. Diaphragmatic perforation is more common on the right than on the left. Abscesses on the right are apt to be monolocular; on the left a great variation exists in shape, location, and loculation, making surgical drainage more difficult. Carter was of the opinion that diagnosis is missed or long delayed in practically all cases of subphrenic abscess of the left side.

Ochsner noted the difficulty of making the diagnosis in subphrenic abscess of the left side. One of my cases was not diagnosed until autopsy, although the possibility of a subphrenic abscess had been considered from the first by the consultants and me.

Roentgenography

The importance of the roentgen-ray findings in the early diagnosis of subphrenic abscess cannot be overemphasized. An elevated, fixed diaphragm on the involved side is the earliest and almost constant finding. This may be demonstrable on lateral or oblique views when not seen on anteroposterior or postero-anterior views. It may be necessary to use overexposure. Early and frequent examinations with 6 foot films should be made, if possible with the patient upright, including anteroposterior, postero-anterior, lateral, and oblique views, and with the patient in Trendelenberg position after he has been given a swallow of barium. This latter method or a film of the patient in upright position after a dose of Seidlitz powders will idenrify the upper margin of the stomach. Normally the stomach is in close contact with the diaphragm, and increase in the space between them may identify an abscess. Also, at times the fluid level and a gas bubble in an abscess will be mistaken for stomach contents unless studies to visualize the upper margin of the stomach are done.

McWhorter noted that the diaphragm is higher at birth, rising to the fourth interspace, as compared to the fifth in 36 year old men and the sixth in 72 year old men.

According to Anspach, the next sign after a high, fixed diaphragm is a fuzziness of the upper surface of the diaphragm on the affected side which results from an adhesive pleuritis. This pleuritis produces an early sealing off between the parietal and visceral pleura overlying the diaphragm. Later, there is a slow, gradual accumulation of exudate which early partially and later completely obliterates the lung field and which may present a well defined horizontal upper margin as time goes on. The amount of exudate invading the pleural cavity tends to be small for a long time. Even when the quantity becomes great in long-standing cases, the lung base tends to remain attached to the diaphragm, and an overexposed film may show the dense triangular shadow of an attached but collapsed lobe. Pneumonitis may overlie the basal exudate, which in the roentgenogram is seen as a secondary faint shadow that seems to follow the general course of the bronchi, gradually extending toward the hilus. When a fistula develops, rest cavities tend to form more readily than in primary pulmonary disease as a result of the noticeable trend for firm pleural adhesions to form; possibly peripheral invasion of infection into the lungs and atelectasis are contributing factors. Loculations between parietal and visceral pleura at

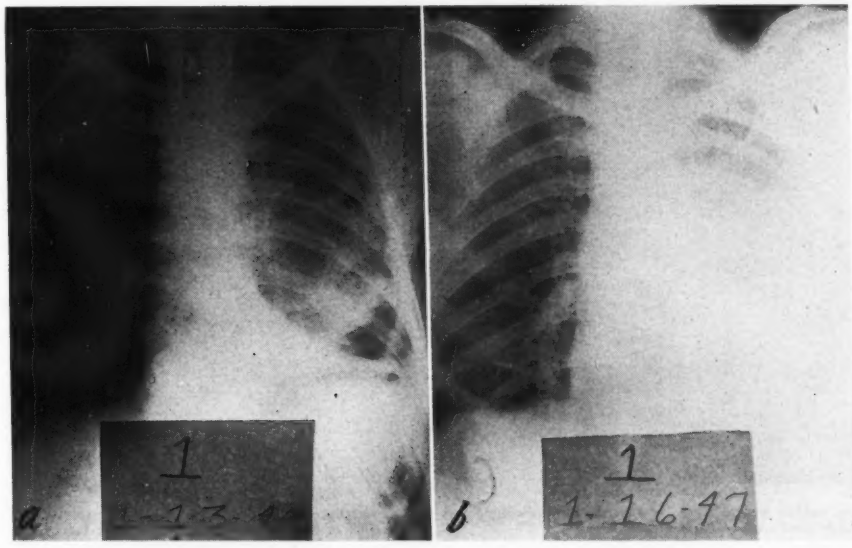

FIG. 4. Introduction of a gas bubble into the stomach with roentgenograms made in Trendelenberg position may identify the upper margin of the stomach.

a. Roentgenogram of a 63 year old white man made nineteen days after resection of the upper half of the stomach. This picture was thought by the radiologist to represent pleural effusion and atelectasis. The left leaf of the diaphragm is elevated with underlying fluid level and gas outside the remaining portion of the stomach; parenchymal infiltration can be noted on the left. The patient had a subphrenic abscess.

b. Another roentgenogram of the patient in *a* taken three days later shows the rapid development of the pathologic lesions of the lung, with the accumulation of fluid obscuring detail.

times may be mistaken for the upper surface of the diaphragm.

A gas bubble with a fluid level beneath the diaphragm was observed in only from one-third to one-half of Whipple's series of more than 1,000 cases and in one-fourth of Anspach's series in children. The fact that many physicians wait for this finding before making a diagnosis is an important contributory factor to late diagnosis and high mortality. It should be remembered, however, that Graham observed a gas bubble under the diaphragm three weeks postoperatively after spinal anesthesia. A gastrointestinal series may reveal matted intestines under fluoroscopy, and perhaps displacement by a mass. Intravenous pyelograms may show a ureter pushed over by a mass.

Anspach stated that lack of increasing roentgen-ray signs is not a reliable criterion on which to base an opinion of arrested progress of this disease, but the disappearance of roentgen-ray signs has gone strikingly hand in hand with clinical improvement and recovery.

Granger has observed that in cases of liver abscess the cardiophrenic angle on the postero-anterior view and the anterior costophrenic angle on the lateral view tend to be obliterated; in subphrenic abscess there tends to be obliteration of the costophrenic angle on the postero-anterior view and the posterior costophrenic angle on the lateral views. The roentgenograms are some of those made of 27 patients observed at St. Joseph's Infirmary, Hermann Hospital, Memorial Hospital, and the Houston Negro Hospital, Houston. Two of the patients were my own.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis becomes apparent. The usual mistake is to regard the patient as having primary lung disease, particularly pneumonia, pleural effusion, empyema, or atelectasis. Differentiation lies in keeping subphrenic abscess in mind, particularly in patients who are good candidates because of a suppurative process in the abdomen, and in searching for the early signs before extensive secondary changes in the lung obscure the diagnosis. The elevated, fixed diaphragm may be the key. In pleural effusion, according to O'Brien, the diaphragm is flat, not dome shaped nor elevated, and the costophrenic sulcus is not clear or is entirely obliterated. There is crowding of the heart and mediastinum to the opposite side.

O'Brien mentioned other causes of elevated diaphragm besides subphrenic abscesses as being hepatic abscess, phrenic paralysis, neuritis, poliomyelitis, tumors of the lungs, mediastinitis, and tuberculosis. Anspach added direct and indirect trauma.

In liver abscess and neoplasms elevation of the diaphragm is apt to be slight and not so uniform with movement less restricted than in subphrenic abscess.

In perinephritic abscesses, as well as liver abscesses, coughing will cause the diaphragm to move slightly,

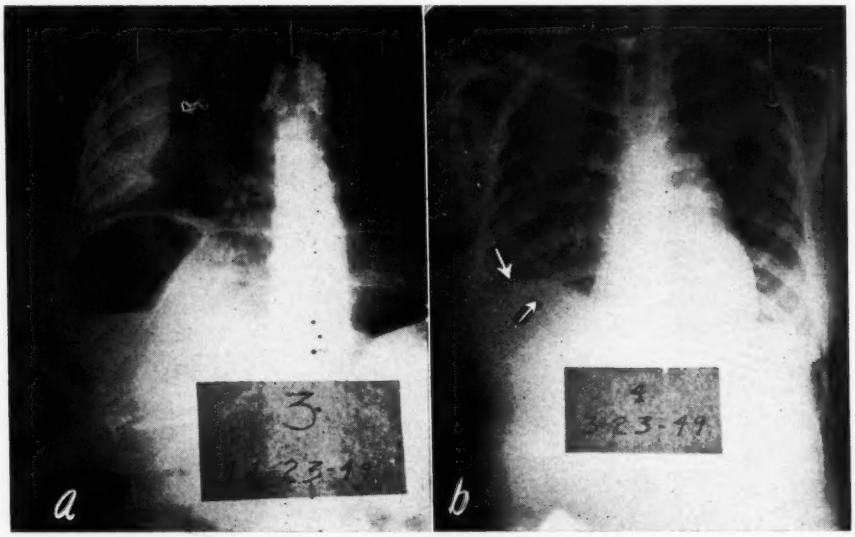

FIG. 5. A gas bubble with a fluid level beneath the diaphragm is seen in only from one-fourth to one-half of the cases.

a. Roentgenogram of a 47 year old white man in whom evidence of subphrenic abscess developed within a week after abdominal trauma with intra-abdominal hemorrhage and possible leaking viscus. The extensive changes seen here were evident within three weeks. The elevated right portion of the diaphragm with the large accumulation of gas overlying the fluid is noticeable. The collection of fluid in the right side of the chest has pushed the lung far over, yet the base of the lung is still adherent from its early adhesion to the diaphragm.

b. Roentgenogram of a 19 year old Negro woman in whom subphrenic abscess followed a liver abscess. Beneath the elevated right leaf of the diaphragm is a fluid level and a small, barely discernible gas bubble.

whereas it will not in conditions such as subphrenic abscess, empyema, diaphragmatic pleurisy with effusion, or a rigidly adherent diaphragm. Neuhoff reported that in a series of 65 perinephritic abscesses at Mount Sinai Hospital only 1 patient had a paralyzed, elevated diaphragm resulting from a large abscess in a late stage.

Hemorrhage into the pleural cavity from trauma to the thoracic wall usually can be differentiated from transphrenic infection. Almost immediate signs of fluid free in the pleural cavity are evident with hemorrhage, and the base of the lung tends not to maintain its normal relationship with the diaphragm. The peripheral portion of the base of the lung is displaced from the costophrenic sinus.

Postoperatively as a result of surgical trauma there may be some reflex restriction of movement of the diaphragm and also free air under the diaphragm.

Gumma of the liver does not restrict diaphragmatic movement much. Neither does hydatid cyst of the liver.

Sante mentioned the necessity for differentiating indurative fibrosis from chronic lung suppuration associated with bronchiectasis. Here Lipiodol injection and bronchograms are helpful. He also mentioned bronchogenic malignancy.

TREATMENT

After an early diagnosis is made, general supportive treatment should be instituted with suitable chemotherapeutic measures. Fowler's position may be helpful, and taping of the side has been suggested. Conservative measures suffice more often in children than in adults.

If the patient does not respond promptly, surgery should be instituted. Ochsner, Graves, DeBakey, and others long have advocated drainage without contaminating uninvolved serous cavities. They have accumulated overwhelming evidence in support of the subdiaphragmatic approach. Most abscesses on the right side can be drained through a horizontal incision through the bed of the twelfth rib, at the level of the spine of the first lumbar vertebra, below the diaphragm. By blunt dissection, the finger proceeds extraperitoneally until the abscess is palpated and then the finger is plunged into it. Right anterior suprahepatic, right infrahepatic, and abscesses of the left side (except left posterior infrahepatic ones) usually can be drained through a subcostal incision as suggested by Clairmont, with extraperitoneal dissection as described above.

Neuhoff and others have condemned the two stage transpleural approach but have had good results with transthoracic, subpleural drainage through the bed or below the twelfth rib. Sometimes they make their approach as high as the seventh or eighth rib in the anterior midaxillary line. Ladd and Swan prefer an incision just below the costal margin in the midaxillary line, proceeding extraperitoneally and subdiaphragmatically in a manner similar to Ochsner's method. Hochberg, with a mortality of only 6 deaths in 71 cases, used a lumbar extraperitoneal approach

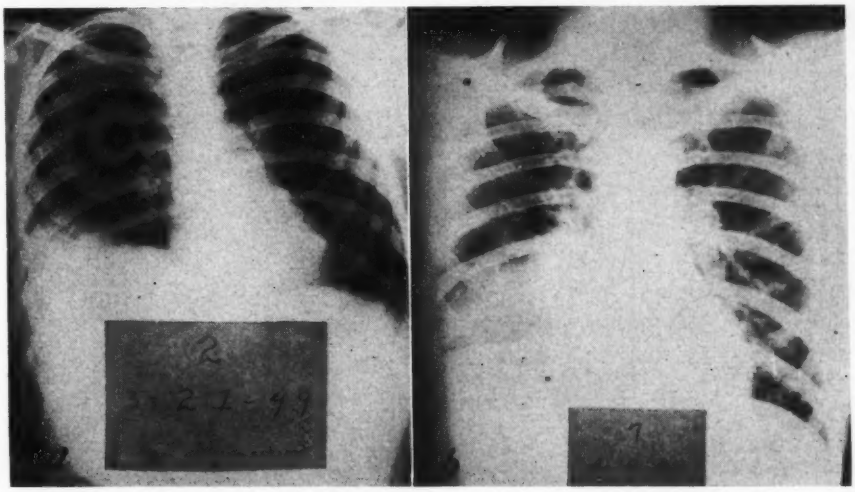

FIG. 6. Pneumonitis may be present overlying the basal exudate of the diaphragm.

a. Roentgenogram of a 12 year old white boy who had had a ruptured appendix with formation of an appendiceal abscess which later was drained. Roentgenograms made five weeks later show the right part of the diaphragm to be elevated with parenchymal infiltration over the periphery of the diaphragm. The roentgenologist suggested the possibility of a subphrenic abscess.

b. Roentgenogram of the patient in figure *2a* made earlier than *2a* and showing the elevated right portion of the diaphragm with well developed parenchymal involvement. The roentgenologic diagnosis of pneumonia was made.

which would suffice for perinephritic abscesses as well as for subphrenic abscesses. Generally speaking, there is no question but that a one stage, extraserous subphrenic approach is best. It is understood that at times a subphrenic abscess may be discovered during an abdominal operation. Where possible, tight closure of the peritoneum after necessary surgery, followed by extraperitoneal dissection with the finger to a point

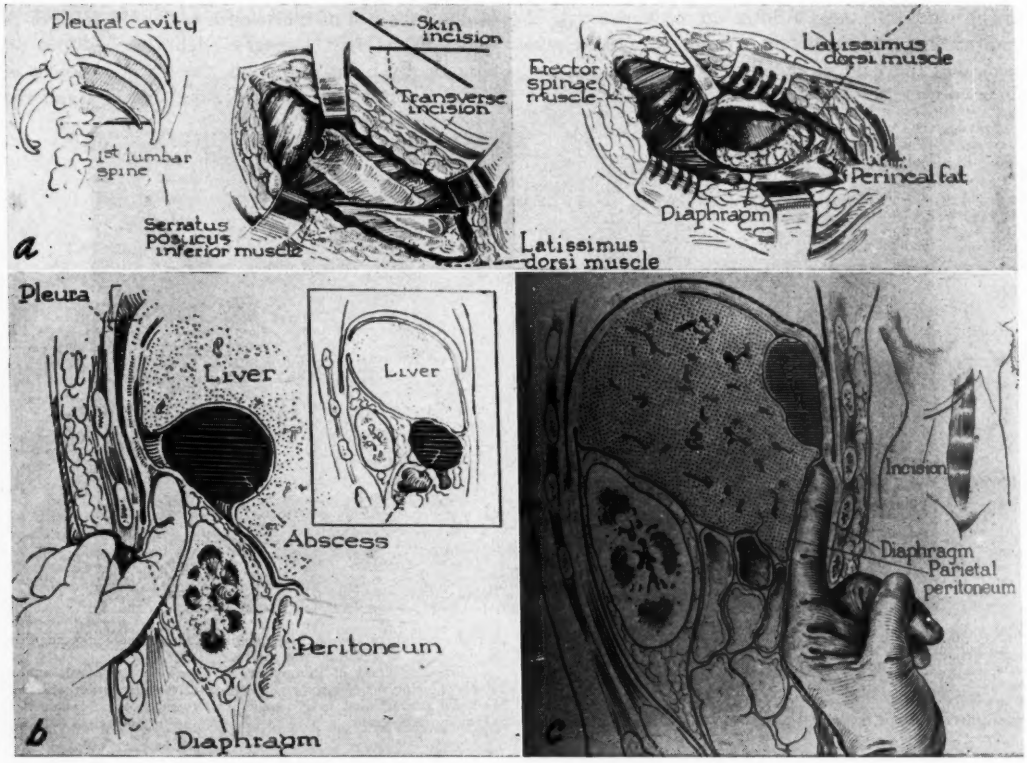

FIG. 7. Diagrams representing the surgical technique for drainage of a subphrenic abscess. [After Ochsner, A., and DeBakey, M.: Liver and Subphrenic Abscess, in Cole, W. H. (editor): Operative Technic in General Surgery, New York, Appleton-Century-Crofts, Inc., 1949, pp. 536-544.]

a. Diagrams representing the extraserous, subdiaphragmatic approach for the drainage of a subphrenic abscess through the bed of the twelfth rib at the level of the first lumbar spine.

b. A continuation of the technique outlined in *a* showing the finger as it proceeds by blunt dissection outside the peritoneum until it reaches the abscess, where it is plunged into the abscess.

c. A diagram showing the subcostal approach, with the finger proceeding by blunt dissection outside the peritoneum until it reaches the abscess, where it is plunged into the abscess.

overlying the abscess with drainage at that point, might be considered.

COMPLICATIONS

As previously indicated, the thoracic complications are the most common and are present in a large percentage of cases; estimates of 85 per cent in older articles are far too low. The diaphragmatic and early parenchymal infiltration have been mentioned. Pleural effusion (variously estimated at from 9 to 100 per cent) and empyema (from 12 to 43 per cent, 17.8 per cent in Ochsner and DeBakey's cases) may occur. The development of bronchopleural fistulas may occur (10.5 per cent in 1,380 cases). Christopher collected 33 proved cases from the literature up to 1938. When bronchopleural fistulas develop, the mortality is 50 per cent; therefore, the unfortunate complication, if discovered and treated, may be a blessing in disguise for those patients who otherwise would not have had diagnosis and proper surgical drainage, with the resultant high mortality of undrained cases. Perforation of the diaphragm from below upward is far more likely (27.7 per cent) than from above downward. Pulmonary infarcts, lung abscesses, and pneumothoraces may occur.

Lockwood has pointed out that there is little danger of spontaneous rupture of a subphrenic abscess into the peritoneal cavity, but it may occur.

Complications may include any condition that might be expected with extremely sick, toxic patients harboring suppuration. A secondary anemia is the rule; extreme toxicity, electrolyte imbalance, hypo-

proteinemia, and renal damage are to be expected. In at least 2 of the cases reviewed in this small series a lower nephron nephrosis was proved at autopsy. Pylephlebitis, hepatitis, liver abscesses, and peritonitis go hand in hand with the subphrenic abscess but are more likely the result of the primary causative factor, such as an acute suppurative appendicitis. Phlebothrombosis may occur.

Mediastinal abscesses are said to occur in from 2.9 to 7 per cent of the cases of subphrenic abscess. Pericarditis has been reported in from 6 to 20 per cent of various series, with direct rupture into the pericardium reported by Cabot in 1 case.

MORTALITY

Of the 70 per cent of cases of subphrenic infection which subside spontaneously without proceeding to suppuration, the mortality is negligible. Of the remaining 30 per cent which proceed to abscess formation, the mortality without drainage is more than 90 per cent. Mortality after transpleural and transperitoneal drainage is approximately from 35 to 50 per cent. In the collected series of Ochsner and Graves, the mortality for those drained without contamination of the pleura or peritoneum was 21.1 per cent; in Ochsner and DeBakey's collected series, 20.8 per cent. Ochsner and DeBakey by 1938 had reduced their operative mortality to less than 10 per cent with 15 consecutive cases with only 1 death. Hochberg had a mortality of only 6 deaths in 71 operated cases, using extraserous drainage, as contrasted to 10 deaths in 19 cases where he had used transserous drainage.

The importance of early diagnosis should be strongly emphasized. Ochsner noted that the average delay in diagnosis was four months. Delays of months and even years are not unusual if the patient survives. Gatewood reported a case with seven years' duration between the primary and secondary operation, and Russell reported a case with similar delay.

CONCLUSIONS

Subphrenic abscess is more frequent than is commonly realized. The mortality could be greatly reduced by early diagnosis and proper surgical treatment. An early diagnosis depends on awareness of the condition and the utilization and understanding of roentgen-ray aids in the diagnosis. It should be emphasized that appearance of gas and a fluid level beneath the diaphragm occurs in only 40 per cent of the cases and, even then, is sometimes a late manifestation. The condition is most often confused with primary lung conditions and the later the differentiation is made, the more difficult it becomes.

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ABSTRACT OF DISCUSSION

DR. MARTIN R. SCHNEIDER, Galveston: From the viewpoint of the roentgenologist who may be called upon for help in the differential diagnosis of subphrenic abscess, may I suggest that roentgenologic study begin with an understanding of the patient's history and physical findings, usually as outlined by the referring physician, and particularly with respect to the time sequence of symptoms?

In the early case rather minimal changes in the film studies will be noted as follows:

1. Blurred contour of the diaphragm indicates an early basal pleurisy but is valuable only if the film exposure time is rapid enough to "stop" respiratory motion; therefore, it is not useful in the bedside film made with the usual mobile unit. Moving the patient to the roentgenologic department for adequate films actually may be a good investment in conserving time.

2. A basal pleurisy, with or without slight effusion, makes it imperative that the lung be examined carefully to differentiate the segmental, lobular, or lobar distribution of the pneumonitis from the nonsegmental basal distribution of compression of the pulmonic base from below by the elevated dome of the diaphragm.

3. Elevation and fixation of the diaphragm may be determined most rapidly by fluoroscopy.

The usefulness and convenience of adequate fluoroscopy should be remembered. Positioning techniques should be used fully in quickly noting the degree of diaphragmatic excursion on each side and in detecting the small early effusion that may lie in the posterior costophrenic angle well below the dome of the diaphragm, which obscures the angle in the

frontal projection. With due regard for the severity of the illness, the patient may be examined standing, lying on a carriage in front of the vertical fluoroscope with each side uppermost in turn, or on a fluoroscopic tilt table.

In the late case of subphrenic abscess determination of the site of origin may be difficult and sometimes not possible because of the following reasons:

1. It may be extremely taxing to differentiate a homogeneous density into component pleural effusion, subphrenic abscess, and the intervening diaphragm. The overexposed films may be of value in such a case, as Dr. Palm has pointed out.

2. Even a gas-fluid level in the abscess, in the minority of cases in which it occurs, may not be evident, particularly if the abscess is on the right side. It is much more common to observe gas in the abscesses on the left side than in those beneath the right hemidiaphragm, because the former more often follow perforated ulcer of the gastrointestinal tract. The upright or lateral decubitus position is essential, of course, for this determination.

3. Occasionally, secondary abdominal roentgen signs may yield additional clues, such as the detection of increased fluid between intestinal loops.

4. Signs of liver or stomach displacement and differentiation of the abscess gas from gastric gas bubble have been discussed adequately by Dr. Palm.

ROENTGEN DIAGNOSIS OF DIAPHRAGMATIC AND ADJACENT LESIONS

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MANY radiologists, I am sure, take the diaphragm more or less for granted; a cursory glance to determine its contour and excursion and we pass on to the remainder of the examination. Indeed the diaphragm is a faithful organ, responding reflexly to any dynamic changes in respiratory function or other pathologic process in the chest or abdomen.

Someone has aptly said that, next to the heart, the diaphragm is the most important muscle in the body. The diaphragm forms a musculo-aponeurotic partition between the thorax above and the abdomen below. Its embryologic development, clearly described by Dunhill,[2] will be discussed later under diaphragmatic hernias. It arises at the periphery by muscular digitations from the lower five ribs, the under surface of the sternum, and the lumbar vertebrae; its insertion is into a central conjoined tendon so that in its relaxed state it extends upward, forming a dome-shaped structure, whereas on contraction it flattens as it moves downward. In its state of maximum contraction it cannot assume anything greater than a plane surface; if a downward bulge is present, it must indicate pressure from above or retraction from below. Normally, in passive respiration, the right leaf of the diaphragm extends upward to about the level of the sixth rib anteriorly; the left part of the diaphragm is usually 2 cm. lower. While the right side of the diaphragm is somewhat higher, the left side has a wider excursion than the right.

The chief function of the diaphragm is respiratory, being correlated reflexly with the intercostal and other muscles of respiration in the fulfillment of this purpose. Any bodily change requiring variation in respiratory function is automatically met by a nervous integration of the various sets of respiratory muscles; if for some reason the chest expansion becomes limited, the diaphragmatic excursion increases, or, if normal diaphragmatic excursion is interfered with, the chest expansion increases. Every bodily function requires a certain amount of aeration of the blood, which is provided by an adequate amount of respiratory movement. If anything interferes with one portion of the respiratory mechanism, the deficiency is made up by increased activity of the other portions. This compensation can be readily demonstrated by

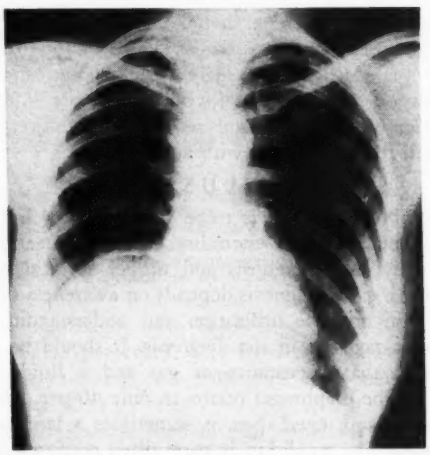

FIG. 1. Roentgenogram showing paralysis of the right leaf of the diaphragm from phrenic nerve resection performed more than fifteen years before for the treatment of tuberculosis. With complete paralysis, the diaphragm atrophies rapidly and within a short time becomes a flail fibrous membrane. The extreme displacement of this diaphragm caused unusual traction on the stomach and duodenum with resulting profound digestive disturbances. In some cases such disturbances have proved fatal.

From the Departments of Radiology of St. Louis University School of Medicine and the St. Louis City Hospital.

Read before the Texas Radiological Society, Dallas, February 3, 1950.

limiting the expansion of the lower thorax with a tight binder; the diaphragmatic excursion will be increased correspondingly. Kymographic studies graphically show extent of diaphragmatic excursion.[19]

In the early days of tuberculosis therapy it was thought that having the patient lie on his side would rest the dependent lung and favor healing. Roentgenologic examination will demonstrate that the more the limitation of expansion of the chest on the dependent side, the greater the excursion of the diaphragm will be on that side. This perhaps explains the statement of Jacobeus that in collecting air from each lung separately by means of a bronchospirometer with the patient lying on his side, the greater amount of air is always returned from the dependent side. Thus it was soon found that lying on one side was not an effective way of resting a diseased lung.

EXAMINATION OF DIAPHRAGM

In roentgenologic examination of the diaphragm the following points must be taken into consideration: presence, position, mobility, contour, and attachments. These necessarily overlap in any examination. For instance, eventration not only causes a change in position but also in mobility of the diaphragm; diaphragmatic adhesions cause limitation of motion and change in contour as well as elevation.

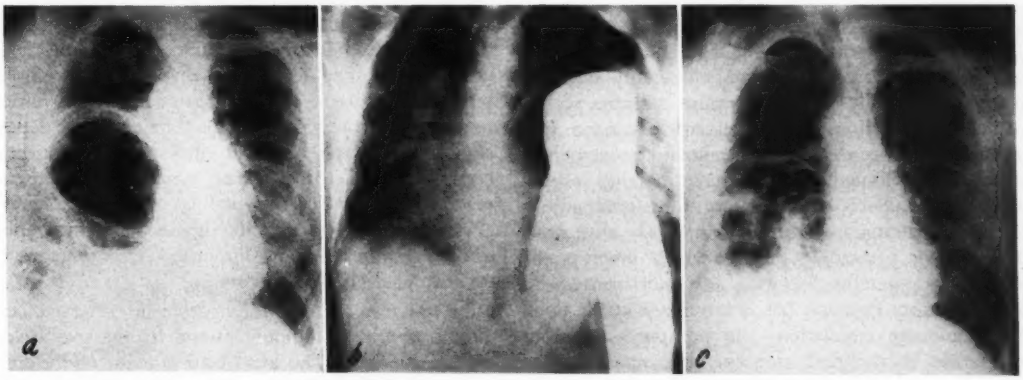

FIG. 2a. Congenital eventration of the diaphragm. The first manifestation of this eventration was in adult life when the patient experienced paralysis of a vocal cord as a result of pressure on the recurrent laryngeal nerve by a huge mass of intestines and other abdominal organs displaced upward into the thorax. The gas-distended colon caused pressure upon the mediastinum.

b. A posterior roentgenogram of the patient in *a* showing the colon filled with barium extending into the thoracic cavity.

c. Another roentgenogram of the patient in *a* showing that at times the small bowel almost filled the pleural cavity.

FIG. 3. Paralysis of all respiratory muscles except the right leaf of the diaphragm. All respiratory function was carried on by this right leaf.

FIG. 4. "Diaphragmatic flutter" in which secondary contraction waves, fully 240 times per minute, become superimposed upon the ordinary diaphragmatic contractions. A peculiar shuffling sound over the anterior region of the chest accompanies this condition.

Congenital Defects

Often such wide defects may be present in the diaphragm as to indicate that a greater portion of one leaf or even one entire leaf may be congenitally absent. Such defects are usually associated with other gross defects of development, but usually they can be only surmised, leaving absolute diagnosis to autopsy.

Mechanical Pressure

Diaphragmatic displacement from mechanical pressure may occur from above or below. Any such displacement brought about by pressure is always accompanied by limitation of diaphragmatic excursion. Furthermore, any decrease in diaphragmatic movement is at once compensated for by increase in other respiratory muscles. Such compensatory functional adjustments are automatically brought into play with practically every pathologic process which involves the respiratory apparatus. Likewise, any interference with the respiratory function has a secondary effect upon the pulmonary circulation; the pumping action of respiration is modified or suspended, retarding the blood flow in the lungs.[17, 20] Interference with proper diaphragmatic function, therefore, may be far-reaching in its effects.

Mechanical pressure from above, such as large pleural effusions or bulky tumors, will result in depression of the diaphragm. Rarely does lung consolidation from inflammatory processes increase the volume of the lung sufficiently to cause diaphragmatic depression and mediastinal shift, but in certain cases of Friedländer bacillus pneumonia at precisely the proper interval after streptomycin medication this may be the case. Other unusual conditions which may depress the diaphragm are enlargement of the aorta due to aneurysm and enlargement of certain chambers of the heart to sufficient size to fill the thorax. I have observed dilatation of the left auricle to such a size that at autopsy it was found to contain 2,000 cc. of blood. Enlargement of the left side of the heart or pericardial effusion may cause depression of the left portion of the diaphragm. Depression of the diaphragm from increased air pressure in the thorax is commonly noted in tension pneumothorax. In bullous emphysema (cystic disease of the lung) also, extensive cystic involvement of the lung structure may occur with increased intrathoracic pressure. Balloon cyst of the lung is another manifestation of the same mechanism which may depress the diaphragm. In emphysema, either of the ordinary parenchymatous variety or of the obstructive type from foreign body, depression of the diaphragm and limitation of motion is one of the principal signs by which the diagnosis is made. Depression of the diaphragm from pressure is always attended by limitation of motion. Kymographic studies graphically show limitation of diaphragmatic excursion in such conditions.

Elevation of the diaphragm from intrathoracic conditions is most commonly caused by massive atelectasis of the lung. The loss of air content of the lung results in a decrease in pulmonary pressure which sucks the diaphragm upward, narrows the affected side of the chest, causes closer approximation of the ribs, and pulls the mediastinum over toward the affected side. In this condition also there is limitation of motion and even after reexpansion following rolling of the patient up onto the uninvolved side, diaphragmatic immobilization still persists for a considerable period of time.[15] Diaphragmatic pleural adhesions, by their retraction, may cause elevation of the diaphragm and limitation of its movement. The elevation is irregular, depending upon the extent of involvement.

Mechanical elevation of the diaphragm from in-

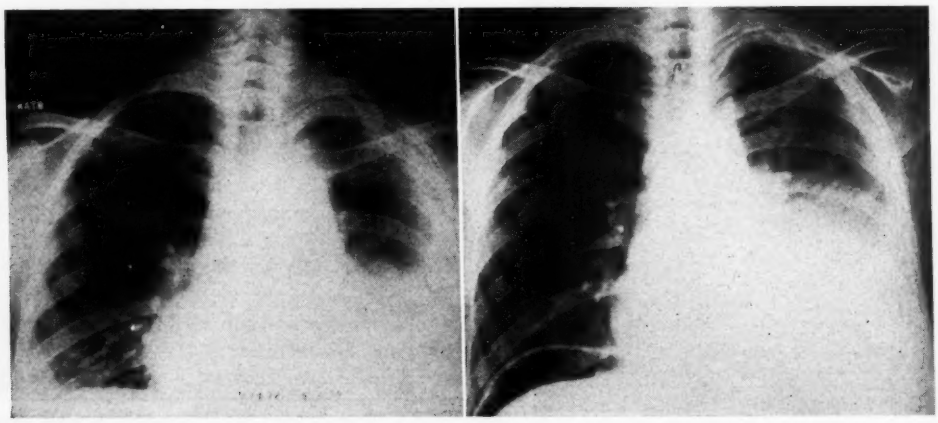

FIG. 5a. Subphrenic abscess may give rise to a "sympathetic" exudate in the base of the adjacent pleural cavity.
b. A small amount of air introduced into the peritoneal cavity will extend into the subphrenic regions if these areas are free from involvement. Failure of the air to extend into the subphrenic space indicates that it is involved by a subphrenic abscess.

crease in pressure from below may be due to a variety of causes including enlargement of the liver or spleen, pregnancy, ascites, gaseous distention of stomach or intestines, and megacolon. A rather rare cause of mechanical elevation of the diaphragm on the right side is the interposition of gas distended loops of bowel between the upper surface of the liver and diaphragm, called "ptosis of the liver."[11]

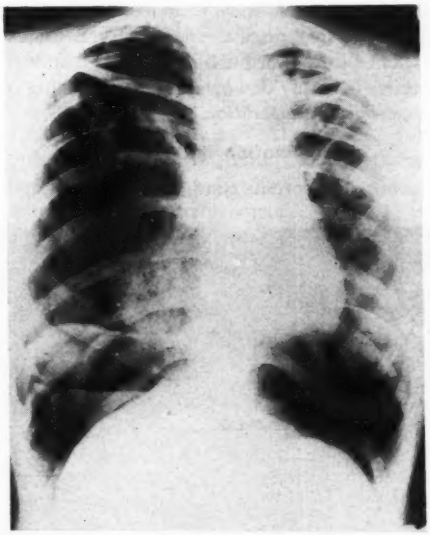

FIG. 6. A scalloped diaphragm still maintaining its appearance after the removal of any influence of adjacent structures by simultaneous induction of pneumothorax and pneumoperitoneum, indicating that the scallop is due to irregular contraction of the diaphragm's mustular digitations from the ribs. It was thought for years that this condition was due to impressions on the diaphragm made by indurated bronchi.

Nerve Action

All of the conditions causing displacement of the diaphragm which have been mentioned thus far are more or less mechanical in nature; the greatest influence on position of the diaphragm is exerted by nerve action. The nerve supply for the diaphragm is primarily from the third, fourth, and fifth cervical branches forming the phrenic nerve. Complete loss of nerve supply on either side is followed by paralysis of the diaphragm on the corresponding side (fig. 1). Within a few weeks after severance of the phrenic nerve, the diaphragmatic musculature begins to atrophy until it is all but replaced by fibrous tissue. As such, it has no contractile power and flaps helplessly about as a "sheet in the wind" during respiration because of the succession of changes in intra-abdominal and intrathoracic pressure; as a result, there develops during respiration a paradoxical action which is characteristic. During inspiration the increased abdominal pressure produced by the descent of the unaffected diaphragm is transmitted through the abdomen to the paralyzed diaphragm, causing it to elevate; during expiration, the reverse occurs. The action of the paralyzed diaphragm is, therefore, paradoxical. This movement can best be observed under fluoroscopic examination or with cineradiographic examination. After a time the lung may accommodate itself to the new conditions and the degree of paradoxical excursion may become more limited; a wide range of paradoxical movement, however, may remain for fifteen or twenty years or even for life. Permanent elevation of the diaphragm may result in such displacement of the stomach and intestines as to produce gastrointestinal symptoms of long standing. In cases in which the phrenic nerve has merely been crushed, paralysis may not be as complete from the outset and diaphragmatic function may be reestablished even after a year or more. Obviously diaphragmatic paralysis has a depressing effect on the expansion of the lung on the affected side, a result which accounts for its success in the treatment of pulmonary tuberculosis. As the partially receding lung becomes more accommodated to the new conditions, the diaphragm has a tendency to become elevated. In effect, the condition thus produced is similar to an anomaly which may be congenital in origin known as "eventration."

Eventration

Eventration of the diaphragm[4] merely constitutes elevation of the diaphragm from absence of normal muscular development and contraction. It occurs most frequently on the left side; few cases have been reported on the right. The membranous diaphragm may become so frail that intra-abdominal pressure causes its displacement and that of the abdominal structures well up into the thorax, at times even to the level of the second rib. If the thoracic inlet at the diaphragmatic level is narrower than the expanding thoracic cavity above, incarceration of the bowel and other viscera may develop with fecal obstruction and mediastinal displacement to the opposite side. I have observed a patient in whom attention was first directed to his eventration of the diaphragm by paralysis of a vocal cord from pressure on the recurrent laryngeal nerve in the thorax (fig. 2). This condition is believed to be either congenital or acquired in the early months of fetal life from phrenic nerve injury. Similar diaphragmatic paralysis may result from phrenic nerve involvement in poliomyelitis or other nerve disorders (fig. 3). In such instances even more drastic effects may be noted because of associated paralysis of certain intercostal muscles. I have observed a child in whom the diaphragm on one side and all of the intercostal muscles were paralyzed from this cause. All respiratory movement came from the contraction of the diaphragm on one side.

"Flutter"

A rare but interesting disturbance which may affect the diaphragm is "diaphragmatic flutter" (fig. 4). This is a condition in which numerous secondary contraction waves become superimposed upon the ordinary diaphragmatic contractions. These are rapid, fully 240 to 300 per minute; they can be observed fluoroscopically occurring simultaneously on both sides. A peculiar shuffling sound over the anterior portion of the chest which accompanies the phenomenon gives the impression of a rapid heart beat. Tracing on the diaphragmatic contractions likewise reveals the secondary waves; the electrocardiographic tracing is essentially normal. The radial pulse is normal or slow, 60 to 88 per minute. This may be accompanied by severe pain in the precordial area and down the arm, giving the impression of an attack of angina pectoris. Phrenic nerve crush (both sides) sometimes relieves the condition and all symptoms and signs disappear. In other instances, the condition still appears at intervals. A few years ago a patient having such attacks was admitted to a number of hospitals throughout the United States and came under the observation of numerous medical groups, including my own at St. Louis City Hospital. A number of reports of the man have been made, all resulting in practically the same findings[10] as described here. The cause of this unusual phenomenon is not known. In some rare cases of cerebral or spinal disease, spasm of the diaphragm occurs. The position of the diaphragm is that of forced inspiration—sharply downward with flattening of the dome causing hyperaeration.[12]

Inflammation and Infection

In another important condition the diaphragm be-

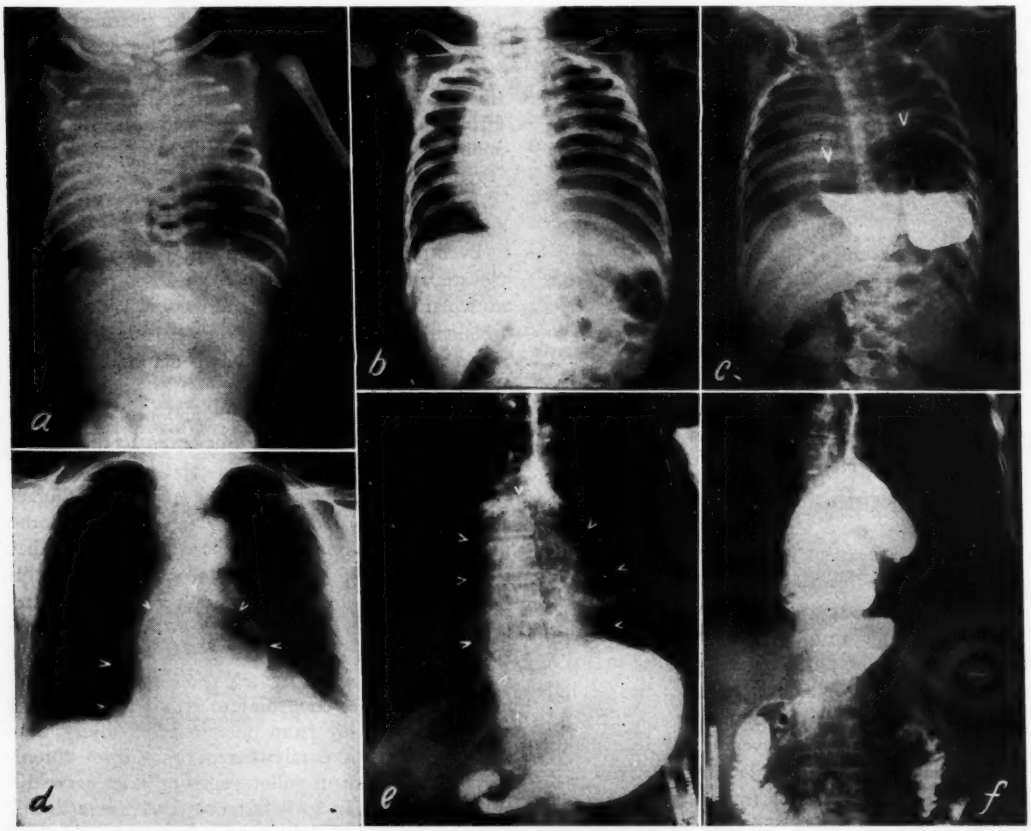

FIG. 7a. Diaphragmatic hernia in a newborn infant, with practically all intestinal structures in the chest. Note the narrowly constructed abdomen and bulging thorax.

b. When the left leaf of the diaphragm is poorly defined, especially in a newborn infant, a diaphragmatic hernia must be suspected.

c. A barium-filled stomach herniated through the posterior segment defect of the left leaf of the diaphragm with inversion of the stomach.

d. Large hiatus hernia showing a gastric air bubble through the cardiac shadow.

e. Results of a "soda pop" test in the case illustrated in *d* showing accentuation of the gas bubble after administration of a bottle of soda pop.

f. Another roentgenogram of the patient in *d* showing the barium-filled stomach extending well up into the retrocardiac position. The esophagus was of normal length.

comes immobilized in a high position as a result of inflammation or irritation from above or below the diaphragm. This is due to neither eventration nor paralysis of the diaphragm but to a splinting defense reaction of the diaphragm from reflex nerve action as a result of pain. Inflammatory conditions of the lung, such as lung abscess or pneumonia before they have spread to involve the parietal pleura, do not interfere with normal diaphragmatic excursion (since the lung and visceral pleura are insensitive), but as soon as the parietal pleura is involved, pain results with immobilization of the diaphragm in a high position. Similarly, involvement of the visceral peritoneum does not interfere with diaphragmatic movement, but irritation of the parietal peritoneum results in diaphragmatic immobilization. Postoperative immobilization of the diaphragm is a common example of this type of reflex involvement.

The mere presence of air under the diaphragm, as occurs in rupture of a hollow viscus, is not sufficient in itself to cause diaphragmatic immobilization. If other irritating material, such as acid stomach contents, escapes with the air, severe pain may result in such reflex action. Prompt administration of antibiotics may allay infection in such cases and recovery may occur with little irritation and without operation.

Subphrenic abscess, however, may result as a primary lesion or as a secondary focus from some primary abdominal lesion such as appendicitis (fig. 5). The diaphragm is immobilized in a high position because of both pressure and reflex splinting from pain. The collection of pus being of the same density as the underlying abdominal viscera often makes detection by ordinary roentgenologic examination impossible. If a gas bubble is present within the abscess cavity, the diagnosis becomes evident, but if this is absent, it is impossible in many instances to locate the diaphragm. For this purpose, artificial pneumoperitoneum with injection of a small amount of air into the abdominal cavity has been found useful.[14] With the patient in the upright position or lying on the side, the air, rising to the top, finds its way between the liver and the diaphragm if this space is free from infection; failure of the air to ascend into the subdiaphragmatic space is presumptive evidence of involvement.

Basal pleural exudates often occur as secondary infectious phenomena from well encapsulated subdiaphragmatic infections.[16] Such pleural effusions may be clear and straw-colored like any other transudate; they need not be purulent. A cell count of the fluid may disclose numerous polynuclear leukocytes, in which case it is evident that the underlying infection which gave rise to the "sympathetic" effusion is due to pus. If the cells are lymphocytes, the examiner becomes suspicious of a localized tuberculous process. The existence of such an exudate may make it increasingly difficult to exclude a possible subphrenic origin; diagnostic pneumoperitoneum, however, serves the purpose of differentiation in this case equally well.

Restricted diaphragmatic movements from this or any other cause may be followed by the development of disklike shadows in the base of the lung just above the diaphragm. These are due to disklike areas of atelectasis of the smaller lung segments which are of no pathologic significance since they disappear promptly on restoration of full diaphragmatic function. Similar structures have been noted as the result of small segmental infarcts; their appearance is identical. I have

FIG. 8. Esophagitis with peptic ulcer. This condition, by contracture of the longitudinal muscle fibers, may result in shortening of the esophagus and retraction of the stomach up into the chest. "Short esophagus," therefore, may not necessarily be congenital.

noted on fluoroscopic examination similar shadows due to the walls of air cysts of the lung. Examination of the chest discloses the appearance of cystic lung disease elsewhere disclosing their true nature.

Arching and Tenting

The contour of the diaphragm is usually smooth, forming dome-shaped arches on either side, but occasionally the contour may take on a double-arched appearance.[13] This is thought to be due to congenital ligamentous strands within the diaphragm, causing depressions in its normal contour. These strands are readily observed at operation, causing pouches on the undersurface of the diaphragm and sometimes corresponding nodulation of the upper surface of the liver; at other examinations, however, this duplicate arching may disappear. This condition may be confused with herniation or even tumor of the dia-

phragm; the use of artificial pneumoperitoneum, however, will readily differentiate between these conditions. Pericardial celomic cyst gives a somewhat similar appearance. Irregular contraction of the muscular digitations as they arise from the ribs may give rise to a scalloped appearance of the diaphragm which, however, is of no pathologic significance (fig. 6). These markings should be distinguished from pointed upward retraction of the diaphragm called "tenting" which is due to adhesions.

Hernia

Diaphragmatic hernias are among the most important defects to which the diaphragm is subjected (fig. 7a). These are chiefly produced by the natural weak spots in the diaphragm resulting from faulty structural development. Dunhill has divided diaphragmatic development into three stages. In the first stage, the celomic space is continuous until the growth of the embryonic organs subdivides it into pericardial cavity, pleural space, and peritoneal cavity. During the second stage of development of the diaphragm, the pleuroperitoneal canal is closed by an ingrowth of its own walls. During this stage a true hernia may occur since the pleura and peritoneum become complete. Any hernia which occurs after this has a true sac. In the third stage the diaphragmatic muscle spreads through the membranous diaphragm. The growth of the muscle may be frail, leading to deficient muscle or attachments of the diaphragm and resulting in gaps in the diaphragmatic structure.

The diaphragm is also pierced by a number of foramina for the passage of important structures between the thorax and abdomen. Chief among these are the aorta, vena cava, and esophagus. The openings for the blood vessels are closely guarded but that of the esophagus is loosely relaxed to permit motion during deglutition. Surgeons state that at operation it is often possible to insert a finger well into the esophageal orifice alongside the esophagus. This loose construction makes it also a vulnerable spot for a diaphragmatic hernia.

The diaphragm, in fully developed form, takes origin on either side by three parts: from the posterior surface of the ensiform process of the sternum (the sternal portion), from the internal surface of the anterior ends of the last five ribs on either side (costal portions), and from the lumbar vertebrae (the vertebral portions). Where these diaphragmatic leaves meet, complete fusion may not take place, leaving weak spots through which herniation may take place. The locations of the various diaphragmatic defects through which hernias may occur gives rise to their classification: parasternal hernias (through foramen of Morgagni); pleuroperitoneal hernias (through defects in fusion between the vertebral and costal portions [Bochdalek]); esophageal hiatus hernias (through the esophageal hiatus); and elsewhere (through dome [traumatic]).

Any of these hernias may be congenital, acquired, or traumatic. Perhaps the most frequent of the congenital hernias is the pleuroperitoneal type (Bochdalek), and the rarest is the parasternal type through the foramen of Morgagni. Esophageal hiatus hernias most frequently by far are acquired.

In children diaphragmatic hernias usually occur on the left side through the pleuroperitoneal hiatus. They are usually detected at birth because of the respiratory and circulatory symptoms they produce. In many cases most of the gastrointestinal tract is herniated into the thorax, leaving the abdominal region strangely homogeneous in appearance with a lower wedge-shaped contraction. The chest is often so filled with abdominal organs that it is impossible to detect the diaphragm until operative repair is undertaken. Occasionally, partial herniation may tax the ingenuity of the radiologist in making the diagnosis. In any case in which the left leaf of the diaphragm is not clearly defined, diaphragmatic hernia must be suspected until proved otherwise. Administration of a barium meal or enema will facilitate the examination (fig. 7b and c).

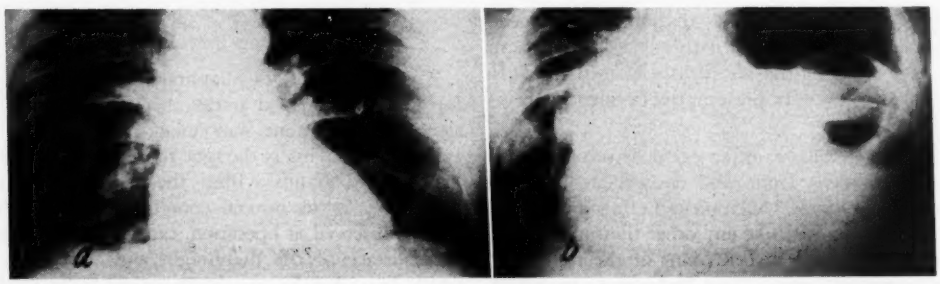

FIG. 9a. Roentgenogram taken immediately after a stab wound in which the chest showed no apparent injury. The patient was discharged within a week.

b. Roentgenogram of the patient pictured in *a* taken six months later when he collapsed after running up a flight of stairs. The examination showed complete pneumothorax with fluid levels and segments of hollow viscera. Death occurred within a few hours. Autopsy showed an opening of an old 6 inch rent in the diaphragm and perforation of the stomach.

Occasionally foramen of the Morgagni hernias will be encountered, but these can be recognized in the lateral view by their anterior position just beneath the sternum. They often contain the colon and can be best demonstrated by barium enema.

Esophageal hiatus hernias are most frequently acquired. These usually develop with obesity because of increased abdominal pressure. With the patient lying upon the abdomen, head tilted downward, the upper end of the stomach is seen to herniate upward along the esophagus through the hiatus and into the retrocardiac region. Often such hernias may be recognized by the detection of the gas bubble of the stomach through the cardiac shadow[7, 9] (fig. 7d, e, and f). To facilitate this observation, soda pop may be given to augment the amount of gas in the stomach. The administration of barium mixture of course clinches the diagnosis. Such hernias have been observed to develop and increase in size over a period of months and years because of constantly increasing obesity. Their detection is of great importance because of the symptoms of precordial oppression which they produce, which may closely similate coronary disease. A number of surgical types of esophageal hiatus hernias have been recognized by Harrington and Kirklin,[6] chiefly on the basis of whether they have a peritoneal sac or whether the esophagus is carried upward into the hernia or is merely attached to the esophagus above. While these authors, mainly on the basis of surgical findings, recognize a number of types of esophageal hiatus hernias, they have expressed the belief that all types should be designated in one inclusive group under this term.

A short esophagus with thoracic stomach is recognized with the esophagus entering the stomach at its upper portion and the stomach itself being above the diaphragm in the mediastinal space (fig. 8). It was believed formerly that these conditions were invariably congenital, but observations have been made of shortening of the longitudinal muscle fibers of the lower esophagus after esophagitis from peptic ulcer. The stomach, which previously had been in its normal position in the abdomen, was drawn high upward through the esophageal hiatus into the thorax.[8] Occasionally the stomach is actually inverted in position as a result of such herniation.

Congenital cysts of the mediastinum are occasionally found containing gastric mucosa; these should probably be more correctly considered as gastric cysts.

Traumatic hernia of the diaphragm is most frequently the result of a severe crushing injury or a stab wound. Strangely enough, rupture of the diaphragm need not be attended with shock or even abdominal rigidity or extreme tenderness. Immobilization of the diaphragm is not always present; where diaphragmatic movement is still present, phrenic crushing operation is done to immobilize the diaphragm. The existence of traumatic hernia of the diaphragm without its immobilization was an Army observation, but it would seem to explain some civilian cases such as those in which air is present in both the chest and abdomen after the patient falls from a bridge 100 feet above and strikes his side or abdomen broadside on the surface of the water.

I have observed a case in which acute diaphragmatic rupture with herniation of abdominal viscera into the thorax occurred six weeks after a stab wound of the chest; the original roentgen examination failed to show any evidence of injury to the diaphragmatic structure (fig. 9). Severe hemorrhage occurring at the time of the rupture resulted in death. Autopsy disclosed an old, poorly healed laceration of the diaphragm.

At times, the differential diagnosis between eventration of the diaphragm and herniation may be difficult. Kirklin has suggested certain helpful observations as indicating hernia: (1) displacement of the lower segment of the esophagus; (2) tortuous terminal segment without dilatation; (3) undue retardation of the barium stream at the hiatus; and (4) observation that the level of gastric contents is above that of the esophageal aperture.

At times induced pneumoperitoneum or pneumothorax may be necessary for the differentiation between eventration of the diaphragm and true diaphragmatič hernia.[3]

The absence of displacement of the heart in esophageal hiatus hernias has been suggested as a point in its differentiation from eventration of the diaphragm. Lateral view examination aids, of course, in identification of the location and type of herniation.

Tumorous Lesions

Tumors of the diaphragm may be considered as curiosities.[1] These may be benign fibroma or rhabdomyoma, or malignant fibrosarcoma. I have observed metastatic carcinomatous lesions within the diaphragm which progressively enlarged in size from week to week under observation.

On the right side small nodules of liver herniating upward through the diaphragm may give an appearance similar to tumors. Induced pneumoperitoneum readily differentiates such conditions.[5] Pericardial celomic cyst produces a rounded mass in the costocardial region which may resemble a tumor, but its precise location serves to differentiate this condition. Foramen of Morgagni hernias are almost in midline. These sometimes undergo infection and form bronchial fistulas.[5]

In one instance I have observed an oblong plaque of bone occurring within the flat diaphragm; it caused no symptoms and did not show any change over a long period of time.

SUMMARY

Practical consideration has been given to variations in diaphragmatic function in health and disease as observed roentgenographically.

Roentgen examination of diaphragmatic conditions may be conveniently made under the following headings: presence, position, mobility, contour, and attachments.

Variations in the roentgenographic appearance of the diaphragm as a result of increased or decreased pressure, nerve influence, eventration, hernia, or adjacent lesions should be recognized.

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VARIATIONS OF THE NORMAL SKULL

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ALL radiologists are aware of the importance of recognizing the normal variations commonly seen in a radiograph of any part of the body. The skull, being the complex structure it is, probably presents more normal variations than any other part of the body, certainly more which are recognizable on the radiograph. It follows that any structure so variable may at times present a diagnostic problem. Fortunately, many of these normal changes have characteristics which make them easy to identify, but some of them are difficult to differentiate from a pathologic process. If, when the radiologist encounters some unusual features, he will first attempt to explain them on the basis of a normal variation, he will find that a surprising number of serious mistakes can be avoided.

Of course, good films are essential in examining the skull, and the importance of stereoscopic films cannot be overemphasized. Many of the finer points in differential diagnosis are completely lost without stereoscopic pictures.

Most of the variations presented here are not what might be considered striking changes, but all of them can be and have been misinterpreted as representing disease. Most of the variations are seen not infrequently in practice.

Read before the Section on Radiology, State Medical Association of Texas, Annual Session, Fort Worth, May 3, 1950.

SIMULATING FRACTURES

There are many normal structures in the skull that may have the appearance of a fracture.

Arterial grooves on the inner table of the skull frequently have the appearance of an old fracture and, occasionally, they are deep, thin, and sharply outlined, suggesting an acute fracture. There are cases in which follow-up examination is the only means whereby the physician can be certain as to whether the line represents an arterial groove or a fracture, but in my experience when this problem arises, the line eventually proves to be an arterial channel in a high percentage of cases. Fractures of the convexity of the skull usually are obvious and present little difficulty in diagnosis. Fractures of the base of the skull may go unrecognized on even the best of films. The criteria of differentiating a fracture from an artery are well known. The fracture line is dark, is sharp in outline, and tapers to a point. There may be skip areas in the line to prove the diagnosis of a fracture. Arterial grooves extend upward and backward and fade at their distal ends.

A vessel that deserves special mention is a branch of the middle meningeal artery that produces a deep

sharp line of decreased density (fig. 1a) that is narrower than the usual arterial groove. This artery is constant in its location, beginning in the lower portion of the temporal bone and extending upward and backward into the lower portion of the parietal bone. It is rarely bilateral and is difficult to differentiate from a fracture. The only differentiated point is that it fades at its distal end rather than ending in a sharp point. Follow-up examinations may be the only way to

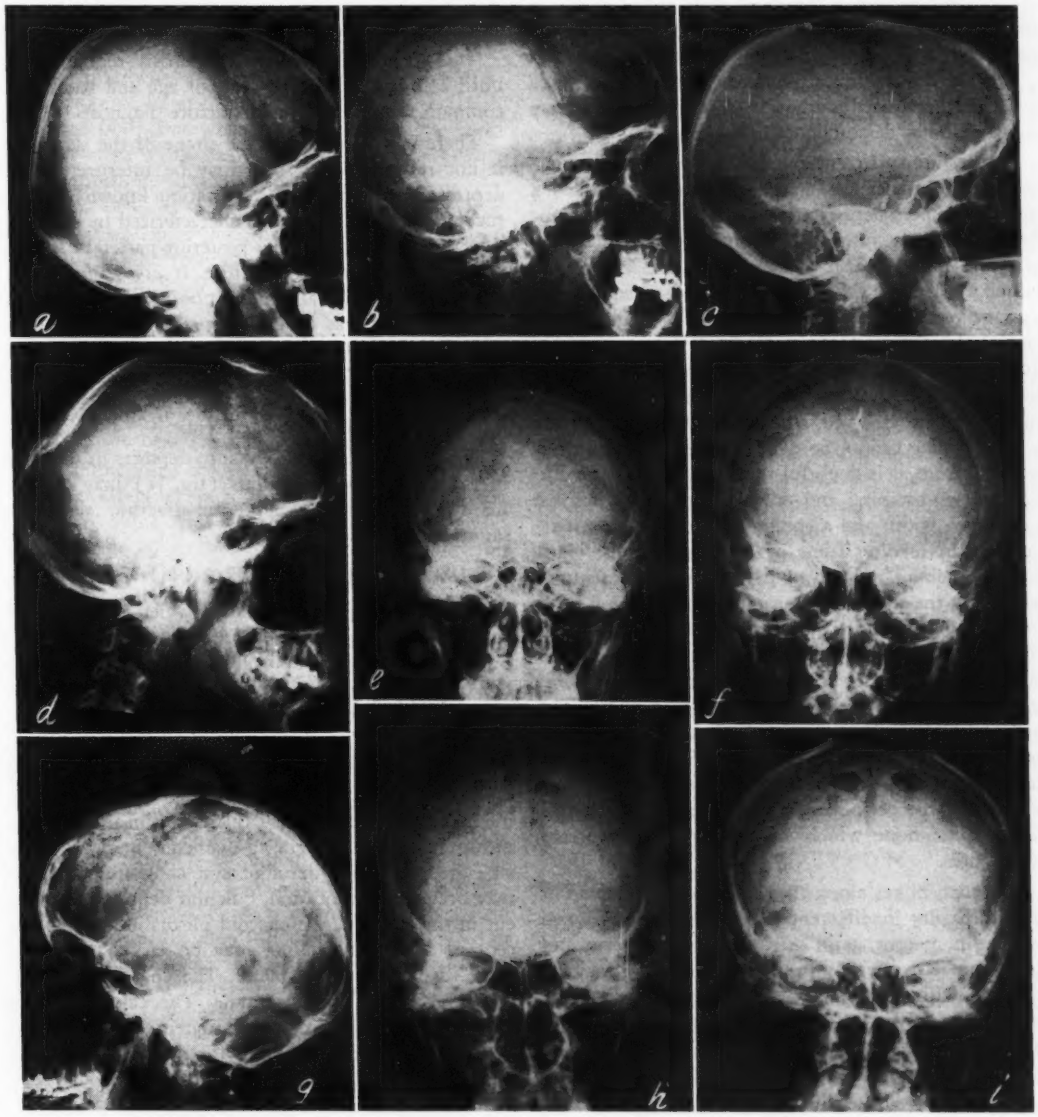

FIG. 1a. Roentgenogram showing a sharp groove in the inner table of the temporal bone produced by a branch of the middle meningeal artery and simulating a fracture.

b. Roentgenogram showing a sphenoparietal venous sinuses and ossification of the temporoparietal suture.

c. Roentgenogram showing a normal lambdoid suture which may be confused with a fracture. Also illustrated is calcification in attachment of the tentorium to the posterior clinoid processes.

d. An example of bathrocephalus. The roentgenogram shows a normal variation of the contour of the skull simulating a depressed fracture. There is also thinning of the inner table just posterior to the bregma produced by the sphenoparietal sinus entering the superior sagittal sinus. The pineal body is calcified.

e. Roentgenogram showing calcium deposits in the walls of the superior sagittal sinus and also arachnoid granulation depressions in the frontal bone with granulations containing calcium.

f. Roentgenogram showing a plaque of calcium in the falx.

g. Roentgenogram showing large diploic venous lakes and channels simulating bone destruction.

h. Roentgenogram showing arachnoid granulation depressions in the inner table of the skull along the superior sagittal sinus associated with shallow depressions.

i. Roentgenogram showing enlarged parietal foramina.

identify this line with certainty, but it is important to recognize the fact that this line does occur in the normal skull.

The sphenoparietal venous sinus (fig. 1b) may produce a deep groove in the inner table of the skull and may show on only one side. This line is wide, however, and presents little difficulty in differential diagnosis.

Stellate venous diploic channels in the parietal area are rarely confused with stellate fractures but may simulate bone destruction.

Sutures are sufficiently variable in their appearance to warrant mention. Ten per cent of cases have a metopic or persistent frontal suture. This may be confused with a fracture of the frontal bone or even the occipital bone. When a metopic suture is present, either the frontal sinus is undeveloped or small buds may be present on either or both sides of the lower end of the suture. The normal lambdoid suture (fig. 1c) varies in width more than the coronal and sagittal sutures and may suggest a fracture, but fractures along the sutures are rare and, when present, are obvious. If a fracture line cannot be demonstrated extending out from a suture, it is doubtful that a diastasis is present. The spheno-occipital and occipitomastoid sutures are variable in width and a common source of error, particularly in reading films of children's skulls. Until a child is about the age of 6 years, there is a suture separating the squamous portion of the occipital bone from the basilar portion. This is seen on the lateral view and is located just posterior to the foramen magnum. In the newborn infant, all of the sutures are wide, sometimes greater than 1 cm. in width. The lack of bulging of the fontanels should prevent misinterpretation of wide sutures as evidence of increased intracranial pressure. The newborn infant shows fissures about the periphery of the squamous portion of the occipital bone which should not be interpreted as fractures.

Wormian bones along the lambdoid suture present little difficulty in differential diagnosis except when they are numerous, as in osteogenesis imperfecta and cleidocranial dysostosis. In these cases, they may be confused with comminuted fractures. A film of the base of the skull may show the sagittal suture superimposed on the basal portions of the sphenoid or occipital bones, and I have seen this called a fracture.

The double suture line has been recognized for years but is still a source of error on occasions. This is simply a superimposition of the ragged teeth of the outer table of the suture on the relatively straight line of the teeth of the inner table. The line in the inner table may at times be straight and deep, resembling a fracture across the teeth of the suture. This is seen most commonly in the sagittal suture and in the persistent frontal suture. The same deep line occurs along the temporoparietal suture but has a different appearance in that the teeth of the outer table are not visible along the suture. The sharply outlined inner table suture may have the exact appearance of a fracture. Because of the long bevel of the temporoparietal suture, this line will appear to be inferior to the external suture but it will conform to the curve of the suture and is usually visible bilaterally.

The spheno-occipital synchondrosis remains open until a child is 10 or 12 years of age and has been a common source of error in fracture diagnosis.

There is a variation in the shape of the skull that, if not recognized as such, may be interpreted as a depressed fracture. It is a variation known as bathrocephalus (fig. 1d) and is characterized by a depression in the midline in the posterior parietal area just anterior to the lambdoid suture. It gives the impression that the occipital bone has outgrown the parietal bones or there was an underdevelopment of the posterior portions of the parietal bones. It is possible that a premature closure of the posterior portion of the sagittal suture is the explanation. This variation in its mild form is a common occurrence.

The presence of heavy calcium deposits in the walls of the superior sagittal sinus (fig. 1e) may be confused with a sharply depressed fracture along the sagittal suture.

SIMULATING BRAIN TUMOR

A more serious error is made when some normal finding is interpreted as representing evidence of a brain tumor. It might be well to start this section with the calcifications which occur so frequently as to be considered normal.

The pineal body is visibly calcified (fig. 1d) in about 60 per cent of persons more than 20 years of age. It is rarely a source of error, but it should be remembered that the normal calcified pineal body may measure as much as 1 cm. in diameter. Tumors in this area are rare but a dermoid cyst containing a tooth may occur in this location. Calcium deposits are present in the knees of the choroid plexus in about 8 per cent of cases. These, too, may be large, measuring more than 1 cm. in diameter. The characteristic calcification is the mulberry type. The calcification is usually bilateral but may be unilateral. Displacement of a choroid plexus as a basis for the diagnosis of an intracranial tumor is hazardous unless the displacement is obvious and consistent on several views because mild rotation of the head may produce a seemingly marked displacement. A recent paper has described a movable calcified glomus that proved to be on a pedicle and changed its position to a noticeable degree on the various views. The choroid plexuses along the floors of the lateral ventricles calcify faintly in rare cases, but if this fact is known, they are easily recognized in stereoscopic views.

Calcium deposits occur in the tentorium near its attachments to the posterior clinoids (fig. 1c) in about 5 per cent of persons and should be easily identified. They have the appearance of a banner or pennant pointed on both ends and attached to the posterior clinoid processes extending down and back and laterally from the posterior clinoid processes for a distance of a few millimeters to 2 cm. The tentorium may contain calcium at its apex and might be confused with the pineal body, but when present, it is in the form of an inverted V, as seen in the occipital or Towne view, conforming to the tentorium.

Calcium deposits in the falx (fig. 1f) are common, appearing as plaques along one side of the falx, more commonly in the frontal area. They are clearly seen in the anteroposterior or postero-anterior views but are indistinct in the lateral views. Characteristically, they have a low triangular shape when seen on end with the apex directed laterally. When they occur on both sides of the falx in the same area, they are separated by a thin line of decreased density, that is, the falx. They are of no pathologic significance.

Calcium deposits occur frequently in the dura along the superior sagittal sinus (fig. 1e) and conform to the walls of the sinus. Arachnoid granulations may contain calcium (fig. 1e) and, when visible, are more common near the superior sagittal sinus. Usually, they are associated with a shallow depression in the adjacent inner table and a diploic vein.

There are normal areas of thin bone in the vault that may be confused with pressure erosion by a brain tumor (fig. 1a and b). They are in the temporal, occipital, and lower frontal areas. In my experience, localized pressure erosion of the convexity of the skull by an intracranial tumor is rare. A thinning of the vault seen commonly to a mild degree and rarely to a marked degree in the parietal bones above the parietal eminences is thought to be due to poor development of the diploic cells in the area. It is sometimes unilateral but more frequently bilateral. Tangential films of this area still show a normal curve of the inner table of the skull with a dip in the outer table producing a flattened area or actual depression. Cases have been reported in which there is a defect in both tables. The differential point that excludes pressure erosion by an intracranial tumor is that the tumor erodes the inner table primarily. This is not to be confused with parietal foramina, to be discussed later.

Prominent convolutional impressions should be evaluated with extreme caution. They are sufficiently common in the normal adult skull to be of little value in determining whether or not increased intracranial pressure is present.

Persons more than 50 years old exhibit varying degrees of decalcification of the bones throughout the body. Decalcification of the posterior clinoid processes in such cases may simulate atrophy from increased intracranial pressure. Even in these persons, true lateral films will show a sharp, thin cortical outline of the clinoids. The diagnosis of increased intracranial pressure from the appearance of the posterior clinoid processes is hazardous at its best in the older age group.

There is considerable variation in the shape of the sella turcica and posterior clinoid processes. The latter may be unusually short normally and should not be confused with erosion by a tumor or an enlarged third ventricle.

Small osteomas of the inner table of the temporal bone are not uncommon and without stereoscopic examination may be confused with calcification in the brain substance or about the sella turcica. Another common site is in the frontal sinus. A small osteoma in the frontal sinus may be interpreted as a displaced pineal body unless seen stereoscopically.

The internal acoustic canals and meatuses may vary in size in the same person as much as 2 or 3 mm. and still be normal. While this variation is common, it is seldom noticed unless the clinical symptoms focus the radiologist's attention on the canals. The diagnosis of an eighth nerve tumor by routine skull films is one of the more difficult tasks in neuroradiology. Definite bone destruction must be demonstrated before the diagnosis can be made. The tumor must involve the nerve in the canal or meatus to produce erosion and only about 50 per cent fall into this category.

Lateral films of the skull sometimes show perpendicular striations along the sagittal suture which represent the teeth of the suture seen on edge. These may be prominent and should not be confused with disease processes such as an invading meningioma or hemolytic anemia.

SIMULATING BONE DESTRUCTION

The venous channels and lakes in the diploic space may be large and numerous (fig. 1g), giving the appearance of an osteomyelitis or metastatic carcinoma. They may be so extensive in the rare case as to require follow-up films to be certain that a destructive lesion is not present.

Arachnoid granulation depressions in the inner table of the skull (fig. 1e and h) are common and present an almost ever present problem as to whether or not they represent small areas of bone destruction. They are more common near the superior sagittal sinus but may occur anywhere over the convexity. Typically, they produce irregular areas of decreased density in the inner table of the skull which are mildly indistinct in outline and may vary in size from 2 mm. to several millimeters. A helpful differential point is that frequently they are surrounded by a shallow depression

produced by a dilated portion of a vein. A diploic vein may end at this point and the arachnoid granulation may contain calcium. The granulation depressions are rarely seen before a person is 10 years of age and may slowly increase in size and number as age advances.

There is an area just posterior to the coronal suture in the midline that deserves special mention. This area frequently shows marked thinning of the vault (fig. 1d) with a pronounced outward ballooning of the inner table but no change in the external contour of the skull. This is a common site for numerous arachnoid granulations associated with a dilatation of the sphenoparietal venous sinus where it empties into the superior sagittal sinus.

Parietal foramina (fig. 1i) are emissary canals through the posterior one-third of the parietal bones near the midline and, when present, are essentially constant in their location. They may be pinpoint in size or several centimeters in diameter, the larger ones being rare. The tendency to enlarged parietal foramina is hereditary with varying degrees of enlargement being present in several or all of the brothers and sisters of a family. Most cases reported have been in the Negro race. A characteristic feature is that the defect in the outer table of the skull is larger than that in the inner table, resulting in beveling of the defect toward the center. This characteristic is easily identified by palpation. These may be confused with burr holes, xanthomas, meningoceles, and so forth. Emissary canals are present infrequently in other parts of the skull, notably in the mastoid areas.

An occasional case will show a diffuse increase in the density of the bone along a suture line. This is common along the coronal suture and less common along the temporoparietal suture (fig. 1b). It is called ossification of the suture and is of no pathologic significance.

SUMMARY

There are many variations of the normal skull which are noted in radiographs and which may lead to incorrect diagnoses. Some of those which are seen fairly frequently and may be recognized with some degree of certainty if their characteristics are known are described. None of the variations presented here are known to be of any clinical significance.

ABSTRACT OF DISCUSSION

DR. CURTIS H. BURGE, Houston: I have always felt that it would be extremely helpful to have an atlas showing the average normal skull at various time intervals early in development after birth. This would be comparable to Todd's "Atlas of Skeletal Maturation" on the hand and wrist and would indicate the average head sizes and common normal variations. Such a book may be available somewhere, but if so, I have not run across it.

In no part of the body is the necessity for good technique more important than in the skull. Of all the bad roentgenograms I have seen, films of the skull and other areas around the head are the most consistently bungled. This applies not only to small town practitioners but also to some of the hospital radiologists in larger cities. I have seen several examples of patients involved in automobile accidents who had roentgenograms made at the nearest hospital or doctor's office with a diagnosis of skull fracture. When the films from which the diagnosis was made were produced, they proved to be so bad technically that the part of the body they were supposed to represent could hardly be recognized; certainly no one would be justified in drawing any conclusions whatever from them.

Any physicians who have had experience in medicolegal cases realize the importance of determining whether or not a skull fracture is present. Considerable compensation has been paid unjustifiably because of diagnoses of skull fractures when actually the lines in question were nothing more than normal vascular grooves. Good technique certainly cannot completely replace experience and good judgment on the part of the interpreter, but it can enhance the ability of a trained interpreter to render correct opinions.

An incomplete interparietal suture and normal sutures between the occipital and mastoid temporal bones in children have given me the most trouble as far as differentiation from fractures is concerned. In the case of the interparietal suture it is necessary to remember only that such a suture does occur occasionally. The other problem usually can be settled by carefully examining both sides of the head.

In instances in which it is necessary to differentiate between multiple pits formed by arachnoid granulations and changes due to a meningioma, it is important to remember that meningiomas nearly always produce some bony proliferation adjacent to the areas of bone destruction.

INSULIN AND CORTISONE IN ARTHRITIS

When insulin is given simultaneously with cortisone, much smaller doses of cortisone may be effective, is the conclusion of five doctors reporting in the July issue of the *Journal of Clinical Endocrinology*. In a preliminary report Drs. Edward Henderson, John W. Gray, Marvin Weinberg, Evelyn A. Merrick, and Harry Seneca state that this combination produced the same degree of relief in arthritis as when cortisone is used alone in the customary large doses.

The study was conducted on twelve patients with typical rheumatoid arthritis who were hospitalized in St. Barnabas Hospital, Newark, N. J. Some were early cases and others were of twenty years' standing with far advanced arthritis. With doses of only 25 mg. daily, most of the patients showed a prompt drop in sedimentation rate of the blood and some evidence of clinical improvement. When advanced to 50 mg. per day, one-half the usual dose, all patients showed subjective improvement and relief of pain, and 10 of the 12 patients showed objective evidence of improvement by normal sedimentation rates, increased movement of joints, and diminution of swelling.

The physicians have stated that the new method not only cuts the cost of treatment to one-half or less, but also offers a means of avoiding some of the dangerous actions of the drug. However, they emphasize that many more carefully controlled hospital studies are necessary before any definite conclusions can be reached.

In the case of breast cancer, 80 per cent of today's cases could be cured through early diagnosis and prompt, adequate treatment; and, yet, only 35 per cent are being cured.—Texas Cancer Triangle, November, 1950.

CASE REPORTS

BRAIN ABSCESS DUE TO NOCARDIA ASTEROIDES

Report of a Case

KLEBERG ECKHARDT, M.D., and JOHN PILCHER, M.D.,
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INFECTION of the central nervous system by Nocardia asteroides and related organisms secondary to lesions elsewhere in the body is not rare. Primary brain lesions, especially abscess, due to such infection are extremely rare. Bollinger[2] in October, 1887, reported the first case of primary actinomycosis of the brain in world literature. His case was that of a 26 year old woman with an actinomycoma of the third ventricle, accompanied by internal hydrocephalus. Russkich and Krylowa[8] in a review of the literature through 1931 cited reports of 5 cases of primary brain actinomycosis including Bollinger's case. They further reported a case of their own which was not a primary case in the true sense of the word but in which, as in most other cases reported, the brain focus was the only demonstrable focus. Eppinger[4] in 1890 first reported abscesses in the brain due to Nocardia asteroides, but here again the lesions were secondary to pulmonary suppuration. Orr[7] reported in 1945 a single case of actinomycoma of the third ventricle, probably primary. However no clear-cut case of brain abscess due to Nocardia without other focus in the body was found reported in literature.

Nocardia usually has been classified with the Actinomycetes even though it is not a true ray-fungus. The organism has been known and classified under various synonyms such as Cladothrix asteroides, Actinomyces asteroides, Streptothrix asteroides, Streptothrix eppinger, Oospora asteroides, and Nocardia asteroides; the latter name is now officially recognized. This multiplicity of nomenclature has confused the literature.

Nocardia asteroides is distinguished from the true actinomyces in that Nocardia is aerobic and at least partially acid-fast. Both in tissue and in culture the organism is composed of fine branching filaments about 1 micron in diameter. These tend to fragmentize and form bacillary or coccoid fragments. The organism is gram-positive but the acid-fast property is variable. The coccoid bodies and some filaments fresh from pus tend to show the acid-fast property more than cultural material. As the cultures get older the acid-fastness decreases. Granules in the pus may or may not be formed. Granules with clubs are rarely seen.

These organisms are usually sensitive to sulfadiazine but this sensitivity seems to vary. Sensitivity to antibiotics is quite variable in different cases. Glover and others[5] reported a case of Nocardial infection in which the organism was not inhibited by 100 units of penicillin per cubic centimeter of medium. Hager and others[6] reported 2 cases, in 1 of which the strain of N. asteroides was inhibited by concentrations of between 0.004 and 0.008 units of penicillin per cubic centimeter, 0.03 and 0.06 units of streptomycin per cubic centimeter, and 0.62 and 1.24 mg. of sulfadiazine per 100 cc. In their other case the strain of N. asteroides was inhibited by concentrations of between 0.015 and 0.030 units of penicillin, 0.12 and 0.24 units of streptomycin, and 0.5 and 1.0 units of aureomycin per cubic centimeter, but was not inhibited by 60 mg. of sulfadiazine per 100 cc. of medium.

In the case reported here the strain of N. asteroides was found to be resistant to 5 units of penicillin and 40 units of streptomycin per cubic centimeter of medium.

FIG. 1. Air encephalogram made a few hours preceding operation for a brain abscess.

Read before the Section on Clinical Pathology, State Medical Association of Texas, Annual Session, Fort Worth, May 3, 1950.

The most common portal of entry appears to be the respiratory tract, mouth, ear, and rarely the anus. It was suggested by Binford and others[1] that the portal of entry in their case was possibly the conjunctival sac. Once the organism has become implanted in the central nervous system headache seems the most frequent symptom with paresthesia and localized muscular twitchings next in frequency. The paucity of findings in physical examination and laboratory procedures is characteristic of the disease. Most cases are diagnosed at postmortem examination. Treatment has been generally disappointing and unavailing.

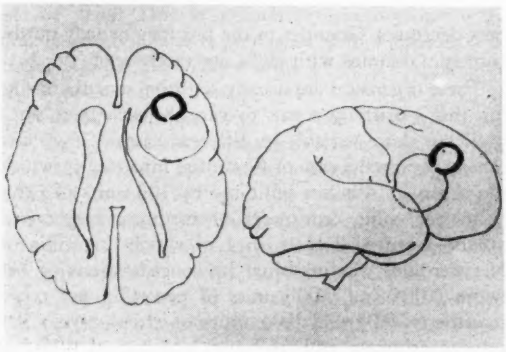

FIG. 2. Drawings showing the gross localization of old and recent abscesses.

CASE REPORT

A white housewife (O. O. B.), aged 50, with partial atrophy and paresis of the left lower extremity resulting from poliomyelitis when she was 13 months of age, was admitted to Spohn Hospital, February 2, 1948. She complained of severe right-sided occipito-parietal headache, attacks of muscular jerking, and numbness and tingling of the left side of the face and left upper extremity associated with semiconsciousness and slight dizziness.

Headache was first noticed about one and one-half years before admission and two months after a tooth extraction. Originally the headache occurred every two to three weeks and lasted from one to two days. There was gradual progression in both frequency and severity until one week preceding admission (January 26, 1948), when the pain became continuous. There was no nausea or vomiting. Other symptoms were lacking until the sudden onset December 29, 1947, of semiconsciousness associated with jerking, numbness, and tingling of the left side of the face and left upper extremity, especially the thumb. The attack subsided after thirty-six hours only to recur at irregular intervals. Tearing of the right eye was occasionally present. Otherwise, the head and neck were clear of symptoms or signs. Results of tests made January 19 and 26, 1948, by a consultant specializing in eye, ear, nose, and throat (Dr. King Gill), including visual fields and fundi examination, were within normal limits, as were the results of laboratory studies and neurologic examination. Despite the dearth of positive diagnostic findings the patient's symptoms rapidly progressed, and she was admitted to the hospital for further studies February 2, 1948.

The past history was inconsequential except for infantile paralysis when the patient was 13 months of age which resulted in partial paralysis and atrophy of the left lower extremity; pleurisy of the left side in childhood; cholecystectomy and appendectomy in 1921; and compound fracture of the right knee at 19. Tuberculosis was prevalent in the paternal family tree. The marital history was noncontributory with the menopause occurring suddenly and asymptomatically in June, 1947.

Physical examination (February 2, 1948) revealed a well developed, well nourished white woman with an old poliomyelitis deformity of the left lower extremity and limping gait. She appeared ill and somewhat dazed but answered questions rationally. The Romberg test was negative. No dependent edema, icterus, dyspnea, cough, cyanosis, or lymphadenopathy was present. The skin appeared normal. No speech defect was apparent. The temperature was 98.6 F., pulse rate 80, respiration 14, and blood pressure 138/92. The woman was 59 inches tall and weighed 117 pounds. The facies was anxious but with normal enervation of its musculature, and no nuchal rigidity was present. The pupils were moderately dilated but equal and reacted to accommodation and sluggishly to light. The sclerae and conjunctivae were mildly injected, but the extraocular movements were normal.

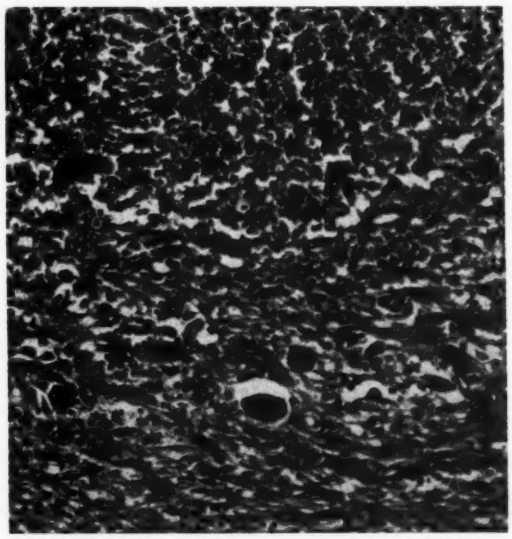

FIG. 3. Photomicograph of the wall of the brain abscess. x 343.

Fundus examination was within normal limits except for slight indistinctness of the disk margins. Nothing abnormal was noted in the ears, nose, throat, or tongue. There were many dental bridges but the remaining teeth appeared sound. The neck veins were not engorged or pulsile. The thyroid gland was normal to palpation. There was some deformity of the thoracic cage due to scoliosis but the lung fields were clear. The point of maximal cardiac impulse was at the left midclavicular line in the fifth interspace with the area of aortic dullness substernal. The pulse rate and rhythm were normal. Heart sounds were heard fairly well with the aortic second sound greater than the pulmonic second sound. A whining, more or less constant, machine-like, grade 3 murmur was audible along the lower right border of the sternum, being maximal just to the right of the tricuspid area. No thrill was present. The abdominal pelvic, and rectal examinations were within normal limits. Except for the above mentioned deformity of the left leg there were no positive findings on

the extremities except for a well-healed fracture scar of the right leg and definite clumsiness of the left hand. The superficial reflexes were normal as were the deep reflexes of the upper extremities. In the lower extremity the deep reflexes were absent. The Babinski sign was negative bilaterally.

Laboratory Studies.—Red blood cells numbered 4,290,000 per cubic millimeter of blood, white blood cells numbered 12,200 per cubic millimeter, and the hemoglobin was 84 per cent. In a differential count polymorphonuclear leukocytes comprised 75 per cent of the total (stabs 4 per cent), lymphocytes 23 per cent, monocytes 1 per cent, and eosinophils 1 per cent. A urinalysis was normal. Blood Kahn and Kolmer Wassermann tests were negative. Blood sugar measured 84 mg. per 100 cc. of blood; nonprotein nitrogen 37.5 mg. per 100 cc. of blood. A lumbar puncture revealed clear fluid with an initial pressure of 18 mm. of mercury; the Queckenstedt test was negative. The spinal fluid revealed a cell count of 8 per cubic millimeter, all lymphocytes; a protein content of 89 mg. per 100 cc.; and a sugar level of 78 mg. per 100 cc. A colloidal gold curve was negative throughout and the fluid resulted in a negative Wassermann test in all dilutions.

Roentgen examination revealed a negative stereo-lateral picture of the skull and a chest plate that showed marked dorsal scoliosis and some blunting of the right costo-phrenic angle probably due to old adhesions, clear lung fields, and a cardiac silhouette within normal limits. A ventriculogram showed poor filling of the ventricular system with displacement of the central structures of the brain to the left by a space-occupying lesion located in the right frontoparietal region.

Electrocardiograms taken January 14 and February 3, 1948, were interpreted as being within normal limits.

Hospital Course.—Symptomatic treatment was instituted. The temperature rose to 99.8 F. on one occasion but was otherwise normal. On the second hospital day (February 3) the patient's condition began to change rapidly with increasing paresis of the left side of the face and left upper extremity. The disk margins became more indistinct with elevation of the nasal half of the left disk. On February 4 the deep reflexes were diminished in the upper left extremity along with loss of the ability to perform the finer movements. A ventriculogram was performed February 5 (by Dr. Ralph Munslow) and was followed by immediate operation.

Under Pentothal sodium anesthesia a subtemporal muscle-bone flap was turned down and a large brain abscess in the frontoparietal area was drained after material was obtained aseptically for culture. Penicillin, 100,000 units, and 4 cc. of Diodrast were left in the cavity. Closure was completed and the patient returned to her room in good condition.

Two hours later the patient's pulse became imperceptible and she died quietly from a respiratory failure.

Pathologic Studies.—Green slimy pus obtained at operation was submitted for bacteriologic examination.

There were no granules present in the pus grossly. Direct smears of pus from the abscess showed small coccoid acid-fast bodies and fine nonacid-fast filaments. Cultures on Sabouraud's medium showed slowly growing white and gray powdery to slightly fluffy colonies. The first cultures showed a few acid-fast filaments and coccoid bodies. Transplants lost their acid-fast properties and showed branching gram-positive filaments, with some segmentation and no sporulation. Growth was obtained on blood agar and nutrient agar at room temperature and in the 37 C. incubator. Growth occurred in aerobic conditions. Smears and cultures revealed no other organisms present. Sensitivity tests showed the organisms to be resistant to penicillin in concentration of 5 units per cubic centimeter and resistant to streptomycin in concentration of 40 units per cubic centimeter.

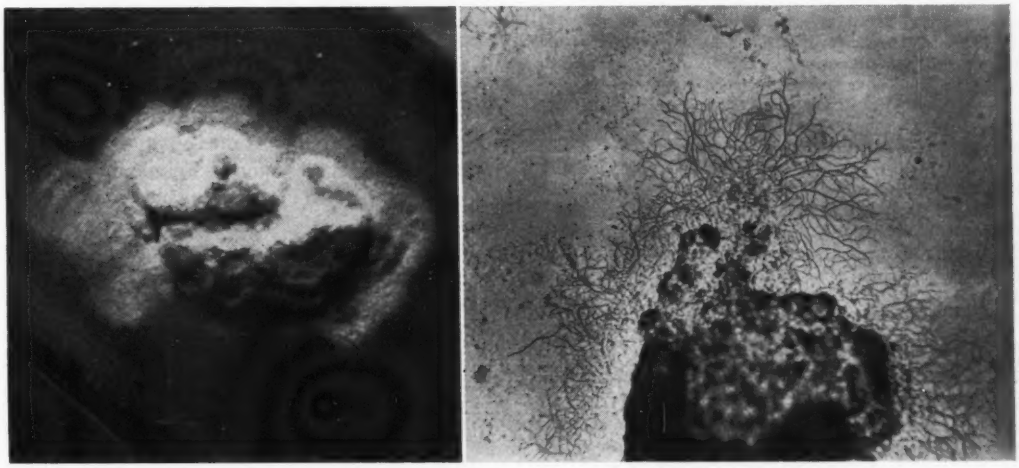

FIG. 4. Left. A gross colony of Nocardia asteroides. Right. A slide culture of Nocardia asteroides. x 280.

This organism was identified as Nocardia asteroides. A subculture was sent to Dr. Norman F. Conant[3] at Duke University, who confirmed the identification. He found the culture to be pathogenic for guinea pigs, one animal showing lesions in lymph nodes and spleen within one month after injection of the culture, with granules in the pus.

Postmortem Examination.—At autopsy the body of the patient was that of a well developed, well nourished white woman about the stated age of 50 years. There were recent operative wounds of the head and an old healed right upper abdominal surgical incision. There was a scoliosis of the thoracic portion of the spine. The left foot showed marked talipes equinus and varus. External examination otherwise was normal. General inspection of the abdomen after opening the serous cavities of the body indicated no abnormalities. There were old fibrous adhesions generally over the right

lung and in the costophrenic angle. The left pleural cavity and pericardial sac showed no abnormal fluid and no adhesions.

The internal organs were normal in all respects grossly with the following exceptions: There was some old contracted scarring at the apex of the right lung. There was no nodule in this scar and no exudate. The gallbladder had been removed. In the right lobe of the liver there was a tremendous vein, apparently the hepatic vein of this lobe, which was 1.5 cm. in diameter and into which small veins emptied. This vein had normal walls. It emptied directly into the vena cava and was as large as the vena cava. It had no direct connection with the portal vein.

Examination of the head revealed linear incisions in the occipital region, apparently for the purpose of ventriculography. There was also a linear incision in front of the right ear, a typical subtemporal decompression. On reflection of the scalp some hemorrhage and edema appeared beneath the incisions. In the occiput there was a burr hole in each side of the skull. In the right temporal region there was a rounded bony defect over which the fascia and muscle had been sutured. Brain substance bulged through the dura at this site. Removal of the calvarium showed that the brain filled the dura tightly. Reflection of the dura revealed a small amount of hemorrhage over the occipital region of the right cerebral hemisphere and over the temporal and frontal regions on the same side, apparently due to hemorrhage from the vessels of the dura. This hemorrhage was not extensive. Upon removal of the brain no abnormalities of the skull bones could be found. The cerebrospinal fluid was clear and there were no inflammatory masses nor other masses in or about the dura. The dura stripped easily and cleanly from the skull.

The brain was soft and enlarged in the right frontal and anterior right parietal region. The central structures of the brain had been pushed to the left by some mass in this region. Sectioning of the brain showed that the ventricles contained a small amount of bloody fluid. The ventricular system had been pushed to the left. Sectioning through the upper cord, midbrain, pons, and cerebellum revealed no abnormalities. Sectioning of the right cerebral hemisphere, however, showed a large abscess cavity just beneath the operative incision and at least 1 cm. below the surface of the cortex. This abscess cavity was about 5 cm. in diameter and contained thick, greenish, purulent exudate and some fluid. The walls of the cavity were soft and poorly defined, there being no encapsulation. In the posterior part of the frontal lobe above and in front of the larger abscess was a connecting abscess cavity about 2 cm. in diameter which had a dense capsule 3 mm. thick. This capsule was unusually dense and this abscess had a rough, well defined lining. It was filled with thick, green, purulent exudate. There was an opening 5 mm. in diameter in this older former abscess cavity where it had ruptured into the larger abscess. The left cerebral hemisphere showed no abnormality except the distortion from pressure of the enlarged right hemisphere.

Microscopic Study.—Sections of the internal organs showed no abnormalities. Neither grossly nor microscopically was there any indication of any infection with Nocardia in the body except in the brain. Sections of the spinal cord, medulla, pons, and left cerebrum showed nothing of note. Sections of the larger, softer abscess walls showed purulent exudate in the abscess. The inner lining of the abscess contained blood and necrotic formless material. Beneath this there was a layer of edematous and hemorrhagic brain tissue. These walls were heavily infiltrated with polymorphonuclear leukocytes. Farther from the abscess cavity there were edema of the brain substance and a decreasingly intense infiltration of polymorphonuclear leukocytes and some lymphocytes. Sections of the walls of the firmer abscess showed a thick wall of tissue, definitely fibrous rather than glial. On the inner surface of this wall was some purulent exudate. Through this abscess wall and about it were a heavy infiltration of lymphocytes and a large number of plasma cells. There were rare giant cells present in this wall of this abscess. Fine branching fungus filaments could be seen in the exudate and in the lining of the abscess cavities.

Diagnoses were as follows: Solitary primary abscess of brain (Nocardia). Scoliosis—dorsal. Talipes—left. Operative absence of gallbladder. Congenital malformation of hepatic vein. Recent operative procedures on head.

It was obvious that for a long time there had been present a chronic abscess which had recently ruptured through the aperture described above and had produced a larger, acute, expanding abscess.

COMMENTS

This case seemed to us worthy of reporting not only because of the rarity of the condition but because clinical, radiologic, laboratory, surgical, and postmortem data are complete, making possible some correlation of the symptoms and pathologic course. The portal of entry was undoubtedly the tooth socket since the symptoms first started about two months after a difficult tooth extraction. There was no history of any local complications of this extraction, so we feel justified in calling this a case of primary infection of the brain. The early symptoms offered no clue to diagnosis or localization of the lesion.

The rupture of the chronic thick-walled abscess to produce a larger, expanding, symptom-producing abscess coincided both clinically and pathologically with the acute onset of symptoms one month previous to admission. Had it been possible to make a diagnosis of the lesion before this acute episode occurred, the lesion might have been amenable to treatment.

The whining continuous murmur heard along the right border of the sternum during life must have been due to the large fusiform enlargement or aneurysm of the hepatic vein. This is an interesting sidelight which has no direct connection with the cause of death.

Fungus infections are probably more frequent than is realized generally and we believe that detailed clinical and especially bacteriologic studies will help to broaden the diagnostic horizon as well as straighten out some of the confusion in the literature about such cases.

The great variability in sensitivity of different strains of Nocardia to sulfonamide drugs and antibiotics makes exact diagnosis of the organisms and sensitivity tests necessary in order to plan any therapeutic attack on the disease.

SUMMARY

A case of primary solitary brain abscess due to

Nocardia asteroides is reported with clinical and postmortem studies.

REFERENCES

1. Binford, C. H., and Lane, J. D.: Actinomycosis Due to Nocardia Asteroides, Report of Case, Am. J. Clin. Path. *15*:17-23 (Jan.) 1945.
2. Bollinger, O.: Ueber primare Aktinomycose des Gehirns beim Menschen, Munchen, med. Wchnschr. *34*:789, 1887.
3. Conant, N. F.: Personal communication to the author.
4. Eppinger, H. L.: Ueber eine neue, pathogene Cladothrix and eine durch sie hervogerufene Pseudotuberculosis, Wien. klin. Wchnschr. *3*:321, 1890.
5. Glover, R. P.; Herrell, W. E.; Heilman, F. R.; and Pfuetze, K. H.: Nocardiosis: Nocardia Asteroides Infection Simulating Pulmonary Tuberculosis, J.A.M.A. *136*:172-175 (Jan. 17) 1948.
6. Hager, H. F.; Migliaccio, A. V.; and Young, R. M.: Nocardiosis: Pneumonia and Empyema Due to Nocardia Asteroides, New England J. Med. *241*:226-231 (Aug. 11) 1949.
7. Orr, T. G., Jr.: Actinomycoma of Third Ventricle, Probably Primary, J.A.M.A. *127*:757-758 (March 31) 1945.
8. Russkich, W. M., and Kryloff, E. S.: Ueber einen Fall von primarer Gehirnaktinomykose, Virchows Arch. f. path. Anat. *281*:797-800 (Sept.) 1931.

616 Medical-Professional Building.

ABSTRACT OF DISCUSSION

DR. RALPH A. MUNSLOW, San Antonio: The rarity of brain abscess due to actinomycosis might be emphasized by quoting the figures of Dr. Courville's experience. In 30,000 autopsies performed in the Los Angeles County Hospital, 31 cases of rare granulomatous infections of the nervous system, of which 7 were due to actinomycosis, were found. Three of these 7 cases were brain abscesses—an incidence of 1 in 10,000 autopsies. I have not been able to find a report of a single successful operative case.

The problem of dealing with such an abscess surgically must be similar to that of abscesses of pyogenic organisms, at least insofar as the control of intracranial pressure is concerned. Whereas most surgeons formerly produced some type of drainage with subsequent herniation of the abscess wall to cure the abscess, the more widespread use of antibiotics has increased the likelihood of success of total surgical extirpation of the abscess in one stage. The chance of cure in such a situation with actinomycosis as the cause of a brain abscess, of course, would be entirely dependent upon the susceptibility of the organism to the sulfa drugs and antibiotics since it is extremely rare that an abscess is extirpated without contamination of the field.

NEWS

COMING MEETINGS AND CLINICS

State Medical Association of Texas, Galveston, May 1-2, 1951. Dr. William M. Gambrell, Austin, Pres.; Tod Bates, 700 Guadalupe St., Austin, Executive Secy.

American Medical Association, Cleveland, Dec. 5-8, 1950. Dr. Elmer L. Henderson, Louisville, Ky., Pres.; Dr. George F. Lull, 535 North Dearborn St., Chicago 10, Secy.

NATIONAL AND REGIONAL

American Academy of Allergy, New York, Feb. 5-7, 1951. Dr. Theodore L. Squier, Milwaukee, Pres.; Mr. James O. Kelley, 208 E. Wisconsin Ave., Milwaukee 2, Executive Secy.

American Academy of Dermatology and Syphilology, Chicago, Dec. 2-7, 1950. Dr. Earl D. Osborne, Buffalo, N. Y., Pres.; Dr. John E. Rauschkolb, 25 Prospect Ave. N. W., Cleveland 15, Secy.

American Academy of General Practice, San Francisco, March 19-22, 1951. Stanley R. Truman, Oakland, Calif., Pres.; Mr. Mac F. Cahal, 406 W. 34th St., Kansas City 2, Executive Sec'y.

American Academy of Neurological Surgery. Dr. William S. Keith, Toronto, Canada, Pres.; Dr. T. C. Erickson, 1300 University Ave., Madison 5, Wis., Secy.

American Academy of Ophthalmology and Otolaryngology. Dr. J. MacKenzie Brown, Los Angeles, Pres.; Dr. W. L. Benedict, 100 First Ave. Bldg., Rochester, Minn., Secy.

American Academy of Pediatrics. Dr. Paul W. Beaven, Rochester, N. Y., Pres; Dr. C. G. Grulee, 636 Church St., Evanston, Ill., Secy.

American Association for Thoracic Surgery, Atlantic City, N. J., April 16-18, 1951. Dr. Alfred Blalock, Baltimore, Pres.; Dr. Brian Blades, 901 23rd St. N. W., Washington, D. C., Secy.

American Association of Genito-Urinary Surgeons, Skytop, Pa., May 16-18, 1951. Dr. Roger C. Graves, Boston, Pres.; Dr. Norris J. Heckel, 122 S. Michigan Ave., Chicago 3, Secy.

American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Hot Springs, Va., Sept. 6-8, 1951. Dr. James K. Quigley, Rochester, N. Y., Pres.; Dr. William F. Mengert, 2211 Oak Lawn Ave., Dallas, Secy.

American Cancer Society. Dr. Alton Ochsner, New Orleans, Pres.; Mr. M. R. Runyon, 47 Beaver St., New York, Exec. Vice-Pres.

American College of Allergists, Chicago, Feb. 11-14, 1951. Dr. John H. Mitchell, Columbus, Ohio, Pres; Dr. Fred W. Wittich, 423 La Salle Medical Building, Minneapolis 2, Secy.

American College of Chest Physicians, Atlantic City, N. J., June 7-10, 1951. Dr. Louis Mark, Columbus, Ohio, Pres.; Mr. Murray Kornfeld, 500 N. Dearborn St., Chicago 10, Executive Secy.

American College of Physicians, St. Louis, April 9-13, 1951. Dr. William S. Middleton, Madison, Wis., Pres.; Mr. E. R. Loveland, 4200 Pine St., Philadelphia 4, Secy.

American College of Radiology, Atlantic City, June 10, 1951. Dr. C. Edgar Virden, Kansas City, Mo., Pres.; Mr. W. C. Stronach, 20 N. Wacker Drive, Chicago 6, Executive Secy.

American College of Surgeons. Dr. Frederick A. Coller, Ann Arbor, Mich., Pres.; Dr. Paul B. Magnuson, 40 E. Erie St., Chicago 11, Secy.

American Congress of Physical Medicine, Denver, Sept 3-8, 1951. Dr. Arthur L. Watkins, Boston, Pres.; Dr. Richard Kovacs, 2 E. 88th St., New York 28, Secy.

American Dermatological Association, Hot Springs, Va., May 23-26, 1951. Dr. Henry E. Michelson, Minneapolis, Pres.; Dr. L. A. Brunsting, 102 2nd Ave., S. W., Rochester, Minn, Secy.

American Gastro-Enterological Association, Atlantic City, June 8-9, 1951. Dr. John G. Mateer, Detroit, Pres.; Dr. Dwight L. Wilbur, 655 Sutter St., San Francisco, Secy.

American Gynecological Society, New York, May 7-9, 1951. Dr. Frederick Irving, Brookline, Pres.; Dr. Norman F. Miller, 1313 E. Ann St., Ann Arbor, Mich., Secy.

American Hospital Association. Dr. Charles F. Wilinsky, Boston, Pres.; Mr. George P. Bugbee, 18 E. Division St., Chicago, Executive Secy.

American Laryngological, Rhinological, and Otological Society, White Sulphur Springs, W. Va., May 6-8, 1951. Dr. Louis H. Clerf, Philadelphia, Pres.; Dr. C. S. Nash, 277 Alexander St., Rochester 8, N. Y., Secy.

American Neurological Association. Dr. Henry W. Woltman, Rochester, Minn., Pres.; Dr. H. Houston Merritt, 710 W. 168th St., New York 32, Secy.

American Ophthalmological Society, White Sulphur Springs, W. Va., June 7-9, 1951. Dr. John H. Dunnington, New York, Pres.; Dr. M. C. Wheeler, 30 W. 59th St., New York 19, Secy.

American Orthopedic Association, White Sulphur Springs, W. Va., June 20-23, 1951. Dr. James S. Speed, Memphis, Pres.; Dr. C. Leslie Mitchell, Henry Ford Hospital, Detroit 2, Secy.

American Pediatric Society, Atlantic City, May 2-5, 1951. Dr. Bronson Crothers, Boston, Pres.; Dr. Henry G. Poncher, 1819 W. Polk St., Chicago 12, Secy.

American Proctologic Society, Atlantic City, June 7-10, 1951. Dr. Hoyt R. Allen, Little Rock, Pres.; Dr. W. Wendell Green, 1838 Parkwood Ave., Toledo 2, Secy.

American Psychiatric Association. Dr. John C. Whitehorn, Baltimore, Pres.; Dr. R. Finley Gayle, 501 E. Franklin St., Richmond, Va., Secy.

American Public Health Association. Dr. Lowell J. Reed, Baltimore, Pres.; Dr. R. M. Atwater, 1790 Broadway, New York 19, Secy.

American Society of Anesthesiologists, Washington, D. C., Nov. 5-8, 1951. Dr. Urban H. Eversoll, Boston, Pres.; Dr. J. E. Remlinger, Jr., 188 W. Randolph St., Chicago, Secy.

American Society of Clinical Pathologists. Dr. James B. McNaught, Denver, Pres.; Dr. Clyde G. Culbertson, Indiana University School of Medicine, Indianapolis, Secy.

American Surgical Association, Washington, D. C., April 11-13, 1951. Dr. Samuel C. Harvey, New Haven, Conn., Pres.; Dr. Nathan Womack, University of Iowa, Iowa City, Secy.

American Urological Association, Chicago, May 21-24, 1951. Dr. Thomas D. Moore, Memphis, Tenn., Pres.; Dr. C. H. deT. Shivers, 121 S. Illinois Ave., Atlantic City, N. J., Secy.

Association of American Physicians and Surgeons, Indianapolis, Oct. 4-6, 1951. Dr. Lawerence Shinabery, Fort Wayne, Ind., Pres.; Mr. Harry E. Northam, 360 N. Michigan Ave., Chicago 1, Executive Secy.

International College of Surgeons, U. S. Chapter. Dr. Custis Lee Hall, Washington, D. C., Pres.; Dr. Arnold S. Jackson, 1516 Lake Shore Drive, Chicago, Secy.

National Tuberculosis Association, Cincinnati, May 14-18, 1951. Dr. David T. Smith, Durham, N. C., Pres.; Dr. H. Stuart Willis, 1790 Broadway, New York 19, Secy.

Radiological Society of North America, Chicago, Dec. 10-15, 1950. Dr. Warren W. Furey, Chicago, Pres.; Dr. D. S. Childs, Medical Arts Bldg., Syracuse 2, N. Y., Secy.

Southern Medical Association. Dr. Hamilton W. McKay, Charlotte, N. C., Pres.; Mr. C. P. Loranz, 1020 Empire Bldg., Birmingham, Ala., Secy.

Southern Psychiatric Association. Dr. R. Finley Gayle, Jr., Richmond, Va., Pres.; Dr. Newdigate M. Owensby, Medical Arts Bldg., Atlanta, Ga., Secy.

Southern Surgical Association, Hollywood, Fla., Dec. 5-7, 1950. Dr. G. V. Brindley, Temple, Pres.; Dr. John C. Burch, 2112 West End Ave., Nashville, Tenn., Secy.

Southwest Allergy Forum, San Antonio, April 8-10, 1951. Dr. J. H. W. Rouse, San Antonio, Pres.; Dr. Boen Swinny, 224 Medical Arts Bldg., San Antonio 5, Secy.

Southwest Regional Cancer Conference. Secy., 209 Medical Arts Bldg., Fort Worth.

Southwestern Medical Association, El Paso, Fall, 1951. Dr. L. W. Breck, El Paso, Pres.; Dr. Wickliffe R. Curtis, First National Bank Bldg., El Paso, Secy.

Southwestern Surgical Congress, St. Louis, Sept. 24-26, 1951. Dr. Leo J. Starry, Oklahoma City, Pres.; Dr. C. R. Rountree, 1227 Classen, Oklahoma City 3, Secy.

Tri-State Medical Assembly. Dr. W. S. Terry, Jefferson, Pres.; Dr. James Harris, Marshall, Secy.

United States-Mexico Border Public Health Association, Los Angeles, April 4-6, 1951. Dr. Luis Arriaga Velez, Chihuahua, Mexico, Pres.; Dr. M. F. Haralson, 314 U. S. Court House, El Paso, Secy.

STATE

Texas Academy of General Practice, Houston, September 10-11, 1951. Dr. Andrew S. Tomb, Victoria, Pres.; Dr. B. H. Bayer, 104 E. Twentieth St., Houston, Secy.

Texas Academy of Internal Medicine, Houston, Dec. 9-10, 1950. Dr. Samuel A. Shelburne, Dallas, Pres.; Dr. John S. Chapman, 3810 Swiss Ave., Dallas, Secy. Meeting restricted to members.

Texas Air-Medics Association, Galveston, April 30, 1951. Dr. D. P. Laugenour, Dallas, Pres.; Dr. C. F. Miller, 906 Medical Arts Bldg., Waco, Secy.

Texas Association of Obstetricians and Gynecologists, Galveston, Feb. 9-10, 1951. Dr. Howard Smith, Marlin, Pres.; Dr. George F. Adam, 4115 Fannin, Houston, Secy.

Texas Chapter, American College of Chest Physicians, Galveston, April 30, 1951. Dr. David McCullough, Kerrville, Pres.; Dr. Henry R. Hoskins, 514 Medical Arts Bldg., San Antonio, Secy.

Texas Club of Internists. Dr. Ghent Graves, Houston, Pres.; Dr. Hatch W. Cummings, Jr., Houston, Secy.

Texas Dermatological Society, Galveston, April 30, 1951. Dr. J. G. Brau, Dallas, Pres.; Dr. W. Harris Connor, 601 Medical Arts Bldg., Houston, Secy.

Texas Diabetes Association, Galveston, April 29, 1951. Dr. B. F. Smith, Houston, Pres.; Dr. W. N. Powell, W. Ave. F, Temple, Secy.

Texas Division, American Cancer Society, Fall, 1951. Mr. Frank C. Smith, Houston, Pres.; Mr. J. Louis Neff, 2307 Helena St., Houston 6, Executive Director.

Texas Heart Association, Galveston, April 30, 1951. Dr. George W. Parson, Texarkana, Pres.; Miss Roberta Miller, 411 Reserve Loan Life Bldg., Dallas, Executive Secy.

Texas Hospital Association, San Antonio, April 24-26, 1951. Mr. Roy Wilmesmeier, Houston, Pres.; Mrs. Ruth Barnhart, 2210 Main St., Dallas, Secy.

Texas Neuropsychiatric Association, Galveston, April 30, 1951. Dr. Martin L. Towler, Galveston, Pres.; Dr. John Blair, San Antonio, Secy.

Texas Orthopedic Association, Galveston, April 30, 1951. Dr. Louis Breck, El Paso, Pres.; Dr. Margaret Watkins, 3629 Fairmount St., Dallas, Secy.

Texas Pediatric Society, Houston, October, 1951. Dr. Thomas D. McCrummen, Austin, Pres.; Dr. M. C. Carlisle, 1410 Austin Ave., Waco, Secy.

Texas Public Health Association, Galveston, Feb. 18-21, 1951. Mr. Barnie A. Young, Austin, Pres.; Mr. Earle W. Sudderth, Dallas County Health Department, Court House, Dallas, Executive Secy.

Texas Radiological Society, Galveston, Jan. 19-20, 1951. Wayne D. Ramsey, Abilene, Pres.; Dr. R. P. O'Bannon, 650 Fifth Ave., Fort Worth, Secy.

Texas Railway and Traumatic Surgical Association, Galveston, April 30, 1951. Dr. R. J. White, Fort Worth, Pres.; Dr. W. F. Parsons, First National Bank Bldg., Fort Worth, Secy.

Texas Rheumatism Association, Houston, Dec. 8, 1950. Dr. Moise D. Levy, Jr., Houston, Pres.; Dr. Robert H. Mitchell, 210 Medical Arts Bldg., Fort Worth, Secy.

Texas Society for Mental Health, Galveston, March 8-9, 1951. Dr. Hamilton Ford, Galveston, Pres.; Mrs. Elizabeth F. Gardner, 1617 Watchhill Road, Austin 21, Executive Secy.

Texas Society of Anesthesiologists. Galveston, April 30, 1951. Dr. Russell Bonham, Houston, Pres.; Dr. Werner Hoeflich, 2301 Reba, Houston, Secy.

Texas Society of Gastroenterologists and Proctologists, Galveston, April 30, 1951. Dr. Carl G. Giesecke, San Antonio, Pres.; Dr. John S. Bagwell, Medical Arts Bldg., Dallas, Secy.

Texas Society of Ophthalmology and Otolaryngology, Dallas, Dec. 8-9, 1950. Dr. V. R. Hurst, Longview, Pres.; Dr. John L. Matthews, 929 Nix Professional Bldg., San Antonio, Secy.

Texas Society of Pathologists, Galveston, Jan. 28, 1951. Dr. Charles Phillips, Temple, Pres.; Dr. A. O. Severance, 205 Camden, San Antonio, Secy.

Texas Surgical Society, Galveston, April 2-3, 1951. Dr. Edward White, Dallas, Pres.; Dr. Truman G. Blocker, 927 Strand, Galveston, Secy.

Texas Tuberculosis Association, Dallas, April 13-14, 1951. Dr. Elliott Mendenhall, Dallas, Pres.; Miss Pansy Nichols, 208 E. Ninth, Austin, Executive Secy.

Texas Urological Society, San Antonio, Jan. 22, 1951. Dr. Hub E. Isaacks, Fort Worth, Pres.; Dr. John M. Pace, 428 Medical Arts Bldg., Dallas, Secy.

DISTRICT

Second District Society. Dr. James W. Rainer, Odessa, Pres.; Dr. Frank M. James, 1021 N. Whitaker Ave., Odessa, Secy.

Third District Society, Amarillo, April 10-11, 1951. Dr. Allen T. Stewart, Lubbock, Pres.; Dr. James T. Hall, 1302 Avenue Q, Lubbock, Secy.

Fourth District Society, Brady, November, 1951. Dr. S. Braswell Locker, Brownwood, Pres.; Dr. B. A. Hallum, Brady, Secy.

Fifth and Sixth Districts Society, Corpus Christi, July 6-7, 1951. Dr. E. King Gill, Corpus Christi, Pres.; Dr. Foy Moody, 1611 Fifth St., Corpus Christi, Secy.

Seventh District Society. Dr. John F. Thomas, Austin, Pres.; Dr. George W. Tipton, 502 W. 15, Austin, Secy.

Eighth District Medical Society, Spring, 1951. Dr Leonard Johnson, El Campo, Pres.; Dr. Robert Casey, Texas City, Secy.

Ninth District Society. Dr. L. E. Bush, Huntsville, Pres.; Dr. Lyman C. Blair, 1212 Rothwell, Secy.

Tenth District Medical Society, Port Arthur. Dr. A. J. Richardson, Sr., Jasper, Pres.; Dr. Dale H. Davies, Liberty, Secy.

Eleventh District Society, Henderson, Spring, 1951. Dr. Griff T. Ross, Mount Enterprise, Pres.; Dr. John M. Travis, Jr., Jacksonville, Secy.

Twelfth District Society, Temple, Jan. 9, 1951. Dr. W. K. Logsdon, Corsicana, Pres.; Dr. N. C. Smith, Hillsboro, Secy.

Thirteenth District Society. Dr. R. L. Daily, Wichita Falls, Pres.; Dr. S. W. Wilson, Medical Arts Bldg., Fort Worth, Secy.

Fourteenth District Society, Bonham, June, 1951. Dr. Mayo Tenery, Waxahachie, Pres.; Dr. L. W. Johnston, 502 W. College St., Terrell, Secy.

Fifteenth District Society, 1951. Dr. R. G. Granbery, Marshall, Pres.; Dr. H. O. Padgett, Marshall, Secy.

CLINICS

Dallas Southern Clinical Society, Dallas, March 26-29, 1951. Miss Betty Elmer, Medical Arts Bldg., Dallas 1, Executive Secy.

International Post-Graduate Medical Assembly of Southwest Texas, San Antonio, Jan. 23-25, 1951. Dr. John J. Hinchey, P. O. Box 2445, San Antonio, Secy.

New Orleans Graduate Medical Assembly, New Orleans, March 5-8, 1951. Dr. Woodard D. Beacham, Room 105, 1430 Tulane Ave., New Orleans 12, Secy.

North Texas-Southern Oklahoma Fall Clinical Conference, Wichita Falls. Dr. Robert L. Daily, 214 Hamilton Bldg., Wichita Falls, Program Chairman.

Oklahoma City Clinical Society Conference, Oklahoma City, Oct. 29-Nov. 1, 1951. Mrs. Muriel R. Waller, 512 Medical Arts Bldg., Oklahoma City 2, Executive Secy.

Post Graduate Medical Assembly of South Texas, Houston, July 23-25, 1951. Dr. Donald M. Paton, Secy., 229 Medical Arts Bldg., Houston.

INCREASES IN FEDERAL INCOME TAX

The accompanying table shows the increases for 1950 and 1951 in federal income taxes as now established by act of Congress. The table, reprinted by special permission from the November issue of *Medical Economics*, is published as a check for physicians who soon will be filing their 1950 tax returns.

Your Tax Increase Under the New Law

(Figures, given here to nearest dollar, are for doctor and wife filing joint federal income tax return.[1])

Combined Net Income after Deductions and Exemptions[2]	1950 Tax Under Old Law	1950 Tax Under New Law	1951 Tax Under New Law
$ 3,000	$ 498	$ 522	$ 600
4,000	664	696	800
5,000	858	896	1,020
6,000	1,051	1,096	1,240
7,000	1,245	1,297	1,460
8,000	1,438	1,497	1,680
9,000	1,667	1,733	1,940
10,000	1,896	1,970	2,200
11,000	2,125	2,207	2,460
12,000	2,354	2,443	2,720
13,000	2,618	2,716	3,020
14,000	2,882	2,989	3,320
15,000	3,146	3,262	3,620
20,000	4,606	4,773	5,280
25,000	6,322	6,547	7,230
50,000	17,824	18,441	20,300
100,000	47,163	48,780	53,640

[1]Assuming they have received no partially-tax-exempt interest income from Government bonds.

[2]Exemptions include $600 for person filing separate return: $1,200 for husband and wife filing joint return; $600 for each dependent. Persons filing returns who are blind or who are more than 65 years old get additional exemptions.

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Regional Meeting of College of Physicians

A regional meeting of the American College of Physicians to include Louisiana, Texas, Tennessee, Alabama, Arkansas, and Mississippi will be held in Memphis on January 12 and 13. Fellows and associates of the College and their wives are invited, and members may invite nonmembers interested in internal medicine.

Dr. D. W. Carter, Jr., Dallas, governor for Texas of the College, will preside at one of the sessions, and the following Texas physicians will present papers: Drs. Charles H. Burnett, chairman of the Department of Internal Medicine, and Arthur Grollman, chairman of the Department of Experimental Medicine, Southwestern Medical School, Dallas; Charles T. Stone, chairman of the Department of Medicine, and George R. Herrmann, professor of medicine, University of Texas School of Medicine, Galveston; and D. E. Jenkins, associate professor of medicine, Baylor University College of Medicine, Houston.

The principal address at a dinner January 12 will be given by Dr. William S. Middleton, president and head of the Department of Medicine of the University of Wisconsin Medical School, Madison.

TEXAS NEUROPSYCHIATRIC ASSOCIATION

The Texas Neuropsychiatric Association met at the San Antonio State Hospital on October 6, with Dr. Guy F. Witt, Dallas, presiding. The following scientific program was presented:

Cerebellar Extradural Hematomas—Dr. Ralph A. Munslow, San Antonio.
Discussion—Capt. E. T. Pfeil, Jr., Fort Sam Houston.

Antabuse Alcohol Reactions Treatment with Ascorbic Acid—Dr. Grady Niblo, Jr., and W. W. Nowinski, Ph. D., Galveston.

Disaster Control—Lt. Col. J. R. Richards, Fort Sam Houston.

Review of Rorschach Factors in Children Who Have Convulsive Disorders and Those Who Present Problems of Adjustment—Lt. Col. Frederick A. Zehrer, Fort Sam Houston.

Electroencephalography in Everyday Practice—Col. J. J. Hornisher, Fort Sam Houston.
Discussion—Dr. Alfred H. Hill, San Antonio.

Preliminary Report on Treatment of Amyotrophic Lateral Sclerosis with Advanced Bulbar Involvement (Use of Brilliant and Traphan Red Intravenously Plus Gastrotomy)—Dr. Hamilton Ford, Galveston.

Transorbital Lobotomies, Review of 150 Cases—Dr. Ellen C. Cover, Dr. F. O. McFarland, and Dr. Pearl Matthaei, San Antonio.

Pathological Studies—Dr. Lewis M. Helfer, San Antonio.

Neuropsychiatric Aspects of Hematoporphyrinuria—Dr. Martin L. Towler, Galveston.

Officers were elected as follows: Dr. Martin L. Towler, Galveston, president; Dr. David Wade, Austin, vice-president; and Dr. James Blair, San Antonio, secretary-treasurer. The society decided to meet during the annual session of the State Medical Association in 1951 in Galveston.

A letter of condolence was sent by the association to Mrs. James Benton, whose husband, Dr. Benton, died recently.

International Post-Graduate Medical Assembly of Southwest Texas

The fifteenth annual International Post-Graduate Medical Assembly of Southwest Texas will be held January 23-25 at the Municipal Auditorium in San Antonio.

Distinguished guest speakers will be as follows:

DR. FRANK L. MELENEY, professor of clinical surgery, College of Physicians, Columbia University, New York.

DR. I. S. RAVDIN, John Rhea Barton Professor of Surgery, Medical School, University of Pennsylvania, Philadelphia.

DR. M. RUIZ CASTANEDA, professor of medicine, National University of Mexico, Mexico, D. F.

DR. CHARLES H. SLOCUMB, associate professor of internal medicine, University of Minnesota Graduate School, Mayo Foundation, Rochester, Minn.

DR. K. J. R. WIGHTMAN, professor-in-charge of therapeutics, University of Ontario, Toronto, Canada.

DR. OSCAR SWINEFORD, professor of the practice of medicine (Allergy-Arthritis Division), University of Virginia, Charlottesville, Va.

DR. JAMES H. WALL, medical director of the New York Hospital, Westchester Division, White Plains, N. Y.

DR. FRANK R. LOCK, professor and head of the Department of Obstetrics and Gynecology, Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, N. C.

DR. C. WILBUR RUCKER, professor of ophthalmology, Mayo Foundation, Rochester, Minn.

DR. MATHER CLEVELAND, attending orthopedic surgeon and director of service, St. Luke's Hospital, New York.

DR. WALTER B. HOOVER, senior otolaryngologist, Lahey Clinic, Boston.

DR. WILLIAM A. MEISSNER, associate, New England Deaconess Hospital, Boston.

DR. HUGH F. HARE, radiologist, Lahey Clinic, Boston.

DR. A. A. WEECH, B. K. Racheford professor of pediatrics, University of Cincinnati, Ohio.

DR. W. W. SCOTT, professor of urology, Johns Hopkins University School of Medicine, Baltimore.

The program has been designed for the general practitioner as well as the specialist. Entertainment will include a cocktail party and dinner dance at Club Sevenoaks the evening of January 23 and a stag party the evening of January 24, with a party for the doctors' wives the same evening.

The registration fee of $20 may be mailed to the International Post-Graduate Medical Assembly, P. O. Box 2445, San Antonio. Reservations should be made directly with the hotel of choice.

UROLOGICAL ASSOCIATION TO MEET IN DALLAS

The South Central Branch of the American Urological Society will hold a seminar in Dallas from January 29 to February 2. Attendance will be limited to the first 150 registrants.

The seminar, sponsored by the Southwestern Medical School of the University of Texas, Dallas, will have the following out-of-state faculty members: Dr. Edward Alyea, professor of urology, Duke University School of Medicine, Durham, N. C.; Dr. Henry K. Beecher, Dorr professor of research in anesthesia, Harvard Medical School, Boston; Dr. William F. Braasch, Department of Urology, Mayo Clinic, Rochester, Minn.; Dr. Ormond Culp, Department of Urology, Mayo Clinic; Dr. Harold Cummins, professor of anatomy, Tulane University of Louisiana School of Medicine, New Orleans; Dr. William Ehrich, chairman of the Department of Pathology, Graduate School of Medicine, University of Pennsylvania, Philadelphia; Dr. H. C. Habein, associate professor of medicine, Mayo Clinic; Dr. T. Leon Howard, Denver, past president of the American Urological Association; Dr. Lloyd Lewis, professor of urology, Georgetown University, Washington, D. C.; Dr. W. W. Scott, Johns Hopkins Hospital, Baltimore; and Dr. E. Uhlenhuth, professor of anatomy, University of Maryland, Baltimore.

Members of the Southwestern Medical School staff who will serve on the faculty include Drs. Carl A. Moyer, Charles H. Burnett, Arthur Grollman, Charles Martin, William F. Mengert, E. E. Muirhead, David Reisman, Ben Wilson, and Henry Winans.

Luncheons, round-table discussions, a clinical pathologic conference, and a pyelographic clinic will be a part of the seminar. The tuition fee is $50. Physicians who have eligibility under the G. I. Bill of Rights are entitled to a rebate from the government for the course if certificates of eligibility are obtained before the meeting.

Further details may be obtained from Dr. R. E. Van Duzen, Chairman, Post Graduate Urological Seminar, 721 Medical Arts Building, Dallas.

TEXAS FELLOWS OF COLLEGE OF SURGEONS

Forty-eight Texas surgeons were among the 978 fellows of the American College of Surgeons who were initiated when the College met in Boston from October 23 to 27. Five honorary fellows also were received into the society.

The Texas fellows are as follows: Drs. Jasper Henry Arnold, Houston; May Bradley Bachtel, Houston; Douglas B. Black, Lamesa; Eli Rush Crews, San Antonio; Eugene Andrew Ellingson, Houston; William C. Fisher, III, Houston; Octavia Garcia, McAllen; James Collin George, Brownsville; Hesiquio Norberto Gonzales, San Antonio; Richard Bruce Grant, Jr., Bryan; Harold Earl Griffin, Corpus Christi; Hans E. Heymann, Corpus Christi; Robert Broaddus Homan, Jr., El Paso.

Also Samuel N. Key, Jr., Austin; Philip S. Kline, Temple; Dwight Rufus Knapp, Kerrville; William Rozelle Knight, III, Houston; Roy T. Lombardo, Beaumont; Dan H. Loving, Amarillo; Frederick C. Lowry, Austin; Ralph D. Mahon, Jr., Dallas; Emile Maltry, Jr., Wichita Falls; George Street McReynolds, Galveston; Charles Augustus Mella, Jr., Corpus Christi; Wa To Mok, Amarillo; Robert R. Nixon, San Antonio; Michael Kinney O'Heeron, Houston; James Edward Pittman, Houston; Claude Pollard, Jr., Houston; Frank McNabb Posey, Jr., San Antonio; Noble H. Price, Lamesa.

Also Henry N. Ricci, San Angelo; Bill Robins, Houston; Jehu Mathews Robison, Houston; Frederick Funston Rogers, Corpus Christi; Charles Bruce Sadler, Amarillo; Jake Shapira, Houston; Elvin Lee Shelton, Jr., Houston; Malcolm Foote Sher, Houston; William P. Stanton, San Antonio; Sidney L. Stovall, San Antonio; Floyd D. Taylor, Abilene; Charles W. Tennison, San Antonio; John F. Thomas, Austin; George W. Tipton, Austin; Virgle Wesley Wallace, Gainesville; Mark Lane Welch, Dallas; Charles M. Wilson, Dallas; and Ben T. Withers, Houston.

Dr. G. V. Brindley, Temple, was elected to the board of governors for a three year term, and Dr. Helmuth Jack Ehlers, Houston, for a two year term. Dr. Henry W. Cave, New York, took office as president, and Dr. Alton Ochsner, New Orleans, was named president-elect.

UNIVERSITY OF TEXAS MEDICAL BRANCH

The fifth annual John O. McReynolds Lecture in Ophthalmology was given by Dr. Arlington C. Krause, Department of Ophthalmology, University of Chicago, at the University of Texas Medical Branch, Galveston, on November 6. He discussed some of his recent studies on eye injury. The lectureship was established in honor of the late Dr. John O. McReynolds, Dallas ophthalmologist, by his daughter, Mrs. Frank W. Wozencraft.

Recent lecturers at the Medical Branch have been *Dr. Arthur Purdy Stout,* professor of surgical pathology at Columbia University College of Physicians and Surgeons, New York; Dr. Peter Gaillard, professor of cytology at the State University of Leiden, Holland; Dr. Peter Martinovitz of the University of Belgrade Medical School, Yugoslavia; and Dr. William Boyd, professor of pathology and bacteriology at the University of Toronto School of Medicine, Toronto, Canada.

Nearly $8,000 in grants for research and gifts of equipment recently have been received by the Medical Branch including the following: $2,212 from the Cabot Carbon Company, Pampa; $2,666 from the American Cancer Society; $4,515 from the Life Insurance Medical Research Fund; $600 from the Upjohn Company; and an $800 machine for the Rehabilitation Clinic from Max Baum, Galveston.

Obstetrics and Gynecology Conference

Dr. E. Stewart Taylor, professor of obstetrics and gynecology at the University of Colorado, Denver, will be the honor guest speaker at the postgraduate conference in obstetrics and gynecology which is being sponsored jointly by the Dallas Southern Clinical Society and the Southwestern Medical School of the University of Texas at Baylor University Hospital, Dallas, from January 8 to 10. In addition eighteen Dallas physicians will give papers.

Lectures will be given each morning and afternoon and round-table luncheons held each day of the meeting. Physicians wishing further information may write the Dallas Southern Clinical Society, Medical Arts Building, Dallas 1.

Southwestern Medical Association

Approximately 220 physicians attended the Southwestern Medical Association conference in Phoenix from October 26 to 28.

Guest speakers included the following: Drs. William Dock, Brooklyn, professor of medicine, Long Island College of Medicine; Joseph W. Gale, Madison, professor of surgery, University of Wisconsin; Leon Goldman, San Francisco, professor of surgery, University of California; John H. Lawrence, Berkley, director, Donner Laboratory of Medical Physics, University of California; George Piness, Los Angeles, associate clinical professor of medicine, University of Southern California; Marcy L. Sussman, Los Angeles, clinical professor of radiology, University of Southern California; Maxwell M. Wintrobe, Salt Lake City, professor and head of Department of Medicine, University of Utah; Stewart Wolf, New York, associate professor of medicine, Cornell University; and Salvador Zubiran, Mexico, D. F., professor of

nutriology, National University Faculty of Medicine of Mexico.

Officers of the association are Drs. L. W. Breck, El Paso, president; Joseph Bank, Phoenix, first vice-president; L. S. Evans, Las Cruces, N. Mex., second vice-president; W. O. Connor, Jr., Albuquerque, N. Mex., third vice-president; and W. W. Schuessler, El Paso, secretary-treasurer.

Among the features of the meeting were technical exhibits, round-table luncheons, a barbecue, dinner dance, cocktail party, and golf tournament. Hostesses for the visiting women were members of the Woman's Auxiliary to the Maricopa County Medical Society.

PERSONALS

Dr. William F. Mengert, Dallas, was elected secretary of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons at a meeting in Jersey City, N. J., in September, reports the Dallas *News.*

Dr. James W. Hendrick and *Dr. Dudley Jackson, Sr.,* San Antonio, presented lectures during the annual assembly of the United States Chapter of the International College of Surgeons in Cleveland, October 31-November 3, according to the San Antonio *Light.*

Dr. R. Lee Clark, Jr., director of the M. D. Anderson Hospital for Cancer Research, Houston, was elected a director of Region 7 of the American Cancer Society recently, reports the *Texas Cancer Triangle.* Region 7 includes Arkansas, Kansas, Missouri, Oklahoma, and Texas.

Dr. Robert E. Slade, Longview, was elected chairman of the regional committee of the Texas Public Health Association, October 5 in Longview.

Dr. F. B. Malone, Lubbock, has been reelected president of the South Plains Council of Boy Scouts. According to the Lubbock *Morning Avalanche,* Dr. Malone has been reelected to this office for nineteen consecutive years.

Dr. Paul Maxwell, Harlingen, was honored for his twenty-year membership in the Harlingen Lions Club in late October, according to the Harlingen *Morning Star.*

Dr. James Minor Alexander, Abilene, was honored on his eighty-third birthday at a dinner and dance given by his children for approximately 100 friends September 18, states the Abilene *Reporter-News.*

Dr. A. T. B. Beauchamp, Blossom, celebrated his eighty-sixth birthday October 24 with his two out of town daughters and other members of his family, reports the Paris *Daily News.*

Dr. G. H. Branham, Menard, observed his one hundredth birthday with a small party October 23, reports the *Menard News.*

Dr. W. A. Connally, Hebbronville, was entertained on his eighty-fifth birthday October 29 at a banquet arranged by his friends throughout South Texas, according to the Corpus Christi *Caller-Times.* Dr. Connally is health officer of Jim Hogg County.

Dr. Craddock Koch Duson and Miss Elizabeth Avon Smith, both of Houston, were married in October, informs the El Campo *News.*

Dr. C. Vernon Carver, Dallas, married Miss Beth Gladden on September 9, reports the University of Texas Medical Branch Alumni *Bulletin.*

Recent births among San Antonio physicians and their wives include the following: *Dr. and Mrs. Charles Tennison, Dr. and Mrs. L. B. Jones, Dr. and Mrs. Albert Celaya, Dr. and Mrs. Alvin Thaggard, Dr. and Mrs. Robert Nixon, Dr. and Mrs. Herschel Childers, Dr. and Mrs. Albert Kass, Dr. and Mrs. Fred Lahourcade,* and *Dr. and Mrs. Vincent Walker,* boys; *Dr. and Mrs. Perry Post, Dr. and Mrs. Dudley Jackson, Jr., Dr. and Mrs. O. H. Timmons,* and *Dr. and Mrs. R. E. Bowen, Jr.,* girls. *Dr. and Mrs. Asher McComb* adopted two little girls, and *Dr. and Mrs. Rowan E. Fisher* adopted a baby boy.

A son was born recently to *Dr. Rebecca T. Duty* and Mr. Duty, Houston, according to the University of Texas Medical Branch Alumni *Bulletin.*

Dr. and Mrs. G. S. Woodfin, Paris, and *Dr. and Mrs. A. H. Neighbors, Jr.,* Austin, are the recent parents of girls, states the University of Texas Medical Branch Alumni *Bulletin.*

ROENTGEN THERAPY IN BREAST CANCER METASTASES

Roentgen therapy is superior to hormone therapy in the treatment of patients with inoperable, advanced breast cancer which has metastasized to bony structures, according to a report in the November 18 issue of *The Journal of the American Medical Association.*

Four San Francisco physicians, Drs. Leo H. Garland, Milton L. Baker, William H. Picard, Jr., and Merrell A. Sisson, submitted the report to the Association's Committee on Research of the Council on Pharmacy and Chemistry. Their group associated with the San Francisco Hospital, Stanford University Service, is one of about fifty throughout the United States and Canada conducting a collaborative study of steroids and their effect on breast cancer under the sponsorship of the Committee.

The report was based on a study of 79 patients treated with irradiation and of 20 patients to whom hormones were administered after it was proved that breast cancer had spread and that the problem was largely palliative in the final stages of life. The physician also reviewed similar reports by other groups. They concluded that about 70 per cent of such patients are relieved of pain by roentgen therapy, relief lasting from 50 to 100 per cent of the survival time in some three-fourths of cases.

In steroid hormone therapy from 40 to 75 per cent of such patients are relieved, the relief being more pronounced in those receiving androgens than those receiving estrogens. Average survival was 12 months, measured from the time the spread to bony structures was established; with hormones, average survival was 8.8 months—8.1 months for patients receiving androgens and 9.7 months for a smaller group receiving estrogens.

The report also pointed out that the steroid hormones produced more side effects and that some cases were considerably aggravated by therapy. Many of these effects could be controlled only by discontinuance of the hormone.

COLLEGE OF SURGEONS SECTIONAL MEETING

The first of a series of seven sectional meetings of the American College of Surgeons will be held in St. Louis on January 22 and 23. The other meetings will be as follows: Hot Springs, Va., February 26 and 27; Philadelphia, March 5 and 6; New Haven, March 16 and 17; Portland, Ore., March 26 and 27; Denver, April 6 and 7; and Detroit, May 10 and 11.

Physicians who are not fellows of the College may attend the meetings. Nationally prominent visiting and local speakers will give addresses.

At St. Louis the sectional meeting will include the showing of medical motion pictures, scientific sessions, four panel discussions, a symposium on cancer, and luncheons. A dinner will be held the first evening of the meeting at which Dr. Melvin A. Casberg, St. Louis, dean of the St. Louis University Medical School, will speak on "The Medical Organization of the Chinese Communists."

Further information about the meetings may be obtained from the American College of Surgeons, 40 East Erie Street, Chicago 11.

LIBRARY SECTION

PACKAGE SERVICE

The package library consists of collections of reprints and other periodical material on various subjects, prepared for lending to members of the Association. Request for packages should be addressed "Library, State Medical Association of Texas, 700 Guadalupe Street, Austin, Texas." Twenty-five cents in stamps should be enclosed with the request to cover postage and part of the expense of collecting the material. Packages are allowed to remain in the hands of the borrower for 14 days.

ACCESSIONS

The following additions were made to the Library during November:

Reprints received, 1,085.

Journals received, 336.

Books received, 13.

Physical Examination in Health and Disease, Kampmeier, F. A. Davis Company, Philadelphia.

Pediatric X-Ray Diagnosis, 2nd edition, Caffey; *Advances in Internal Medicine,* Vol. IV, Dock and Snapper, Yearbook Publishers. Chicago.

Folic Acid, Lederle Laboratories, American Cyanamid Company, New York.

Bronchoesophagology, Jackson and Jackson; *Regional Orthopedic Surgery,* Colonna, W. B. Saunders Company, Philadelphia and London.

Emergencies in Medical Practice, 2nd edition, Birch, Williams and Wilkins, Baltimore.

Orthopedic Surgery, 4th edition, Mercer; *Basic Principles of Clinical Electrocardiography,* Hecht; *Newer Concepts of Inflammation,* 1st edition, Menkin; *Golden Anniversary Monograph,* American Roentgen Ray Society; *Bacterial Polysaccharides,* 1st edition, Burger, Charles C. Thomas, Springfield, Ill.

When Minds Go Wrong, 1st edition, Grimes, John Maurice Grimes, Chicago.

SUMMARY OF SERVICE

Local users, 52. Borrowers by mail, 114.
Items borrowed, 191. Packages mailed, 48.
Films loaned, 59.

MOTION PICTURE FILM LIBRARY

Motion picture films on medical subjects, 16 mm., both silent and sound, some in color, and suitable for either medical or lay audiences, are available for loan to county medical societies, hospital staffs, or individual physicians, on request. Borrowers will be required to pay only the cost of shipment of the films, by express, with insurance, and for any damage to films in the hands of the borrower.

Request for films should be addressed to "Motion Picture Film Library, State Medical Association of Texas, 700 Guadalupe Street, Austin, Texas." A list of available films, with descriptions, will be furnished on request.

The following motion picture films were loaned by the Film Library during November:

Accent on Use (National Foundation for Infantile Paralysis)—Dr. V. M. Payne, Dallas.

Aids in Muscle Training (American Medical Association)—Dr. V. M. Payne, Dallas.

A.M.A. Newsreel (American Medical Association Department of Public Relations)—Drs. Hyslop and Hyslop, Del Rio.

Anemia, Erythroblastic (Mead Johnson)—Veterans Administration Hospital, Kerrville, and Seton Hospital School of Nursing, Austin.

Anesthesia, Novocain, in Obstetrics (Winthrop Chemical Corporation)—Milam County Medical Society, Cameron.

Anesthesia with Vinethene (Merck and Company)—Drs. Hyslop and Hyslop, Del Rio.

Another to Conquer (Texas Tuberculosis Association)—Elementary and High School Students, Denison School District, Denison.

Appendicitis in Childhood (Mead Johnson)—Gilbert and Roberts Clinic, Irving.

Appraisal of the Newborn (Mead Johnson)—St. Paul's Hospital School of Nursing, Dallas.

Be Your Age (Metropolitan Life Insurance Company)—Drs. Hyslop and Hyslop, Del Rio.

Behind the Shadows (Texas Tuberculosis Association)—University of Houston, Houston.

Blood Transfusion (British Information Services)—Jones-Watkins Clinic, Wellington.

Breast Cancer: The Problem of Early Diagnosis (American Cancer Society)—Johnson County Medical Auxiliary, Cleburne, and Drs. Hyslop and Hyslop, Del Rio.

Cancer: The Problem of Early Diagnosis (American Cancer Society)—Gilbert and Roberts Clinic, Irving.

Cesarean Section, Low Cervical (Mead Johnson)—Seton School of Nursing, Austin.

Cloud in the Sky (Texas Tuberculosis Association)—Drs. Hyslop and Hyslop, Del Rio, and Elementary and High School Students, Denison School District, Denison.

Coarctation of the Aorta, Surgical Treatment for (Dr. Philip Thorek)—Drs. Hyslop and Hyslop, Del Rio, and Veterans Administration Hospital, Kerrville.

Conquering Darkness (Dr. V. R. Hurst)—Harris College of Nursing, Fort Worth, and Brackenridge School of Nursing, Austin.

Diphtheria Antitoxin, Preparation of (American Medical Association)—Harris College of Nursing, Fort Worth.

The Doctor Speaks His Mind (American Cancer Society)—Drs. Hyslop and Hyslop, Del Rio.

Eyes for Tomorrow (Hurst Eye, Ear, and Throat Clinic)—Harris College of Nursing, Fort Worth.

Eyes, Your Children's (British Information Services)—Jacksonville High School Physical Education Classes, Jacksonville.

Forty Billion Enemies (Westinghouse Electric and Manufacturing Company)—Gonzales High School, Gonzales.

From Moo to You (Borden Company)—Jacksonville High School, Jacksonville.

Gastrectomy, Safer (Billy Burke Productions)—Wilson N. Jones Hospital Staff, Sherman.

Goiter Surgery (Mead Johnson)—Wilson N. Jones Hospital Staff, Sherman.

Golden Glory (Standard Brands)—Gonzales High School, Gonzales.

Hemicolectomy for Carcinoma of the Right Side of the Colon (Dr. Philip Thorek)—Wilson N. Jones Hospital Staff, Sherman.

Hidden Hunger (Swift and Company)—Gonzales Public Schools, Gonzales.

Injuries, Athletic, Care and Prevention (Becton, Dickinson and Company)—Medical and Surgical Clinic, Laredo.

Intracranial Injuries of the Newborn (Mead Johnson)—Drs. Hyslop and Hyslop, Del Rio.

Let My People Live (Texas Tuberculosis Association)—Parent-Teachers Association, Rusk.

Management of the Failing Heart (Varick Pharmacal Company)—Drs. Hyslop and Hyslop, Del Rio.

Mastoid Surgery (Dr. Louis Daily)—Brackenridge Hospital School of Nursing, Austin.

Modest Miracle (Standard Brands) — Gonzales High School, Gonzales.

On the Firing Line (Texas Tuberculosis Association)—Mothers Club, Convent School, Refugio.

Once upon a Time (Metropolitan Life Insurance Company)—Drs. Hyslop and Hyslop, Del Rio.

Pediatric Anomalies (Mead Johnson)—Drs. Hyslop and Hyslop, Del Rio, and Seton School of Nursing, Austin.

Poliomyelitis, Sister Kenny Method of Treatment of (Dr. Herbert Hipps)—University of Houston, Houston.

Portacaval Shunt for Portal Hypertension (Dr. Philip Thorek)—Alpha Epsilon Delta, Austin.

Post-Poliomyelitis Paralysis, Operative Procedures (National Foundation for Infantile Paralysis)—De Witt County Medical Society, Cuero.

Premature Infant, Care of (Mead Johnson)—St. Paul's Hospital School of Nursing, Dallas, and Seton School of Nursing, Austin.

Proof of the Pudding (Metropolitan Life Insurance Company)—Drs. Hyslop and Hyslop, Del Rio.

Pyloric Stenosis, Congenital, Surgical Treatment for (Dr. Philip Thorek)—Drs. Hyslop and Hyslop, Del Rio.

A Question in Time (American Cancer Society)—Pre-Medical Association, Southwestern University, Georgetown.

Scabies (British Information Services)—Harris College of Nursing, Fort Worth.

Scarlet Fever (Lederle Laboratories)—University of Houston, Houston.

Strabismus Surgery (Dr. Ray K. Daily)—Harris College of Nursing, Fort Worth, and Brackenridge Hospital School of Nursing, Austin.

TB, This Is (Texas Tuberculosis Association)—University of Houston, Houston, and Mothers Club, Convent School, Refugio.

They Also Serve (American Medical Association)—Registered Nurses Association, Taylor.

Time Is Life (American Cancer Society(—Pre-Medical Association, Southwestern University, Georgetown.

Trichomonal and Monilial Vaginitis (G. D. Searle and Company)—Brackenridge Hospital School of Nursing, Austin.

Urologic Conditions, Diagnosis (Winthrop Chemical Corporation)—Urology Service, Parkland Hospital, Dallas.

Vagotomy for Ulcerative Colitis (Dr. Philip Thorek)—Drs. Hyslop and Hyslop, Del Rio.

Varicose Veins and Their Complications (Becton, Dickinson and Company)—Dr. V. M. Payne, Jr., Dallas.

Varicose Veins, Treatment of (G. D. Searle and Company)—Dr. V. M. Payne, Jr., Dallas.

Vitamins and Some Deficiency Diseases (Lederle Laboratories)—Scott and White Memorial Hospitals School of Nursing, Temple.

What Is Cancer? (American Cancer Society) — Johns Clinic and Hospital Training School, Taylor, and Registered Nurses Association, Taylor.

You Can Help (Texas Tuberculosis Association)—Parent-Teachers Association, Rusk, and Parent-Teachers Association, Jacksonville.

BOOK NOTICES

[1]Current Therapy

Howard F. Conn, Editor. Cloth, 736 pages. $10. Philadelphia, W. B. Saunders Company, 1950.

This work maintains the high standard of the 1949 edition. It is again clear, concise, and easily read. The authors are outstanding in their respective fields. Methods of management are stressed throughout the book.

I believe that this is still the most authoritative and usable book on treatment available at this time. The editor, the contributors, and the publishers have made available to the profession an excellent reference work on treatment. The section on dermatology is particularly valuable for the practitioner who is called upon to treat an occasional case.

[2]Pediatric Nursing

Gladys S. Benz, R. N., M. A., Associate Director, Union University School of Nursing, Albany, N. Y. Cloth, 638 pages. $4. St. Louis, C. V. Mosby Company, 1948.

Miss Gladys Benz has written an excellent textbook for the student nurse in the basic curriculum.

In the first unit the changing attitude toward the child as it relates to the development of pediatric nursing is done in an interesting manner. The unit on growth and development covers all phases of growth as well as play and story telling as an integral factor in the development of the child. This entire subject is treated as it relates to the nursing of the child. The third unit, "Nursing Care of the Child," is well done, including the psychologic approach to the sick child. With growing interest in the prevention of disease and in the public health aspects of pediatrics, Miss Benz has discussed the care of the child in the community.

[3]Mask of Sanity

Hervey Cleckley, M. D., Professor of Psychiatry and Neurology, University of Georgia School of Medicine, Augusta. Second edition. Cloth, 569 pages. St. Louis, C. V. Mosby Company 1950.

In his second edition of the "Mask of Sanity," which he has completely rewritten to include more extensive clinical and investigative material, Dr. Cleckley has given a comprehensive discussion of the psychopathic personality. Although his approach to the subject is that of a scientist, he writes with a style which makes much of his volume, especially the case reports, read like a mystery novel.

Dr. Cleckley sets out to prove that the patient with a psychopathic personality is a distinct, clinical type with a fixed personality profile, the chief characteristic of which is a superficial charm and good intelligence, who is well known to psychiatrists, society, the law, and the home because of behavior which at times is decidely antisocial. He points out further that the behavior of this person can neither be regarded as insane nor normal, that treatment has been futile, and that only after some nonexisting medicolegal instrumentalities are implemented will help be forthcoming.

Dr. Cleckley tries to establish a cause for such an abnormal personality and finally concludes that the underlying mechanism is some deep emotional conflict. The cases he presents, which he estimates to be between 15 and 25 per cent of the population of any clinic, hospital, or jail, in his opinion are the real psychopathic personalities. He believes psychiatrists should have clearer concepts since the diagnosis "constitutional psychopathic inferiority" or "constitutional psychopathic state" does not include his cases; he finds no evidence

[1]*Herbert J. Bell, M. D., El Paso.*
[2]*Robert L. Moore, M. D., Dallas.*
[3]*Arthur J. Schwenkenberg, M. D., Dallas.*

in them of constitutional traits. He further points out that the present classification of psychopathic personality includes too wide a group of disorders which are not truly psychopathic. For example, he does not include homosexuality.

This book, even though technical in places, should help the parents or relatives of persons with psychopathic personalities to understand more about their problem. It points out the necessity for a correct diagnosis before relatives make a futile effort to shield these patients, for they invariably fail to adjust satisfactorily to society.

As a matter of fact, this book should be read by everyone since it explains many of the persons in our society who appear at times entirely normal and even brilliant, and at other times for no apparent reason behave "insanely." Santayana said, "The true dignity of man is his ability to despise himself." Dr. Cleckley goes on to say, "The psychopath is without the means to acquire true dignity.

[4]The 1949 Year Book of Urology

Oswald S. Lowsley, M. D., Director, James Buchanan Brady Foundation, New York Hospital; Visiting Urologist, Saint Clare's Hospital; Consulting Urologist, Hospital for Ruptured and Crippled, Peekskill Hospital, Editor. Cloth, 445 pages. $5. Chicago, Year Book Publishers, 1949.

"The Year Book of Urology for 1949" is one of the most informative of all similar publications issued to this time. The editorial review is unusually attractive and covers a comprehensive analysis of the literature.

The section dealing with renal physiology is particularly important in that the use of electrolytes and blood in combating urinary failure shows a greater appreciation of conservative management. The section on surgery shows the improvement in uretero-intestinal anastomosis by observing the principle of accurate mucosa to mucosa suture. The discussion of retropubic prostatectomy suggests a wider application of this operation and a reduction in the number of transurethral resections for prostatic obstruction. The discussion of male infertility suggests an acceptable basis for its understanding. For example, the number of active sperm in apparently normal men has been set at 83,000,000 as a dividing line between fertile and infertile males.

It would be improper not to mention the operation of Dr. Lowsley for Peyronie's disease in selected cases as this is evidently a successful method of meeting a distressing situation.

Congratulations are due Dr. Lowsley as editor of this volume for the completeness of the review and for the readability of the text. It is a book that every urologist should have.

[5]Varicose Veins

R. Rowden Foote, M. D. Cloth, 226 pages, $8. St. Louis, C. V. Mosby Company, 1949.

This is an exceptionally concise, informative, and clear book on all aspects of the treatment and care of varicose veins. It is written in a simple, easy to understand, readable manner.

The chapters on history, anatomy, and pathology are not dull, but rather add to the book. In the sections on diagnosis and treatment the author gives all methods in brief but gives his favorite methods in detail.

Physicians and surgeons not interested primarily in varicose veins would still be interested in this book because of its discussion of anticoagulant therapy, thrombophlebitis, and pulmonary embolism. Useful information on setting up a varicose vein clinic is included.

Throughout the book the author has made clear his opinions as to the best methods of doing a particular phase of the work, but he has not been dogmatic in stating that other methods would not be equally successful.

[6]Significance of the Body Fluids in Clinical Medicine

L. H. Newburgh, M. D., Professor of Clinical Investigation, University of Michigan Medical School, Ann Arbor. Fabrikoid, 76 pages. $2. Springfield, Ill., Charles C. Thomas, 1950.

This volume is taken from material delivered as the Ernest A. Sommer Memorial Lectures by the author in the summer of 1946. The lectures have been revised and newer concepts added.

Approximately the first half of the book is devoted to a discussion of the physiology, biochemistry, and biophysics of electrolyte and water balance. The subject is complex, but the author succeeds in making it understandable by using simple drawings and equations.

The second half discusses the clinical application of the previously described fundamental principles. Since variation from normal in body fluids exists in all seriously ill patients, both medical and surgical, an understanding of the principles set forth in this book is necessary to all physicians.

[7]Malignant Disease and Its Treatment by Radium

Sir Stanford Cade, K.B.E., C.B., F.R.C.S., M.R.C.P., Surgeon, Westminster Hospital; Consulting Surgeon, Mount Vernon Hospital and Radium Institute; Lecturer in Surgery, Westminster Medical School. Second edition, vol. 3. Cloth, 446 pages. $12.50. Baltimore, Williams and Wilkins Company, 1950.

The author presents this volume on malignant disease in the precise manner of a scientist. The following anatomic sites are considered: breast, intrathoracic region, esophagus and stomach, female urogenital tract, bladder, penis, rectum, and anus.

Radium is the method of treatment most often employed. The author has been intimately associated with the group which utilizes the radium needles to the maximum. Particularly in the treatment of breast cancer is this mode of attack exploited. The chapters on breast carcinoma and uterine carcinoma are the longest and most complete. The discussion of metastasis in breast carcinoma is excellent and offers thought for changing the fields when treating postoperative patients. The text is of value to surgeons and therapists who are sufficiently bold to go "all out" in the treatment of cancer, using radium needles and plaques freely.

[8]The Antihistamines—Their Clinical Application

Samuel M. Feinberg, M. D., Associate Professor of Medicine and Chief of Division of Allergy and Director, Allergy Research Laboratory; Saul Malkiel, Ph. D., M. D., Assistant Professor of Medicine and Director of Research, Allergy Research Laboratory; and Alan R. Feinberg, M. D., Clinical Assistant in Medicine, Attending Physician in Allergy Clinic, Northwestern University Medical School, Editors. Cloth, 291 pages. $4. Chicago, Year Book Publishers, 1950.

This small volume consisting of 219 pages of text is divided into ten parts. The first 100 pages deal with histamine, its pharmacologic action, and its role in allergy; the antihistaminic pharmacology used in experimental anaphylaxis; and bioassay in man. This section reflects adequately the background for experimental work in this field. However, for research workers it could only be considered an introduction to these phases of the antihistaminic drugs and a starting point for conducting research.

The remainder of the text is devoted to the use of the

[4]*Frank S. Schoonover, Jr., M. D., Fort Worth.*
[5]*C. G. Goddard, M. D., Bastrop.*
[6]*Edwin G. Faber, M. D., Tyler.*
[7]*Ben DuBilier, M. D., Austin.*
[8]*L. O. Dutton, M. D., El Paso.*

antihistaminic drugs in clinical practice. Different allergic syndromes are considered separately, each being discussed from the standpoint of the use of antihistamines in general and also of specific antihistaminic drugs. Reported clinical trials are surveyed adequately, and there are good discussions on the results to be expected, side effects, dosages, and modes of administration. There is a definite tone of conservatism in the reports of the authors. Their conclusion seems to be that the field of most usefulness lies in the control of sneezing and rhinorrhea in hay fever.

Limitations of antihistamines in treatment of other allergic syndromes are pointed out. The authors particularly discourage use of these drugs in the treatment of asthma. Most observers believe that their use will not prevent the development of pollen asthma in hay fever sufferers, even though nasal symptoms are well controlled. Throughout the text the authors discourage the use of the antihistaminic drugs as the sole agent in the control of allergic syndrome. There is a particularly illuminating section dealing with the use of these drugs in treatment of the common cold. After carefully surveying reported observations, the authors reach the opinion that the antihistaminic drugs do not significantly modify the common cold and they condemn their over-the-counter sale for this purpose.

In view of the widespread use of these drugs by practitioners in all fields, this volume serves a timely purpose in presenting confirmed and authoritative opinions. It should help to curb the widespread abuse of antihistamines and encourage better and more effective utilization of these drugs, which have undoubted merits.

There is a handy table in the appendix listing the antihistaminic drugs in tabulated form, giving the chemical name, manufacturer, trade name, forms in which they are dispensed, and the ingredients of each preparation.

The bibliography covers a total of 586 items and is indicative of the care the authors have taken to bring a true reflection of the present status of these drugs in the treatment of allergies.

ORGANIZATION SECTION

STATE MEDICAL ASSOCIATION

PUBLIC AND PROFESSIONAL RELATIONS COMMITTEES NAMED

In accordance with a recommendation of the Committee on Public Relations, the House of Delegates of the State Medical Association, meeting in Fort Worth last spring, authorized the establishment of a statewide "grievance committee" to handle complaints with respect to the patient-physician relationship, unprofessional conduct, or noncompliance with the Principles of Medical Ethics. The action of the House of Delegates provided that the state committee would be composed of fifteen members, one being elected by each district committee from its membership. It further provided that each district committee would include three physicians to be appointed by the Board of Trustees.

The Board of Trustees, with the advice of district councilors, has now named the district committees, to be known as Committees on Public and Professional Relations. It is anticipated that these district committees soon will elect the state committee to hear appeals from the district committees. The relationship of these committees with each other, with county grievance committees, and with county boards of censors and the Board of Councilors is explained in some detail in the report of the Committee on Public Relations as published in the transactions of the House of Delegates in the June issue of the JOURNAL, page 412.

Membership in the district Committees on Public and Professional Relations is as follows:

District 1.—Harry Varner, El Paso; Jim Camp, Pecos; Russell Holt, El Paso.

District 2.—James W. Rainer, Odessa; John E. Hogan, Big Spring; Thomas J. Melton, Jr., Midland.

District 3.—Marvin Overton, Pampa; H. H. Latson, Amarillo; E. W. Jones, Wellington.

District 4.—H. L. Locker, Brownwood; J. S. Anderson, Brady; C. A. Kunath, San Angelo.

District 5.—William E. Gregg, Kerrville; H. J. Bonnstetter, Kenedy; W. W. Bondurant, San Antonio.

District 6.—C. P. Yeager, Corpus Christi; W. E. Whigham, McAllen; Ernest Miller, Beeville.

District 7.—M. F. Kreisle, Austin; Joe V. Fleming, Elgin; David Wade, Austin.

District 8.—Ralph Gray, Lake Jackson; J. L. Otto, Galveston; Frank A. Prather, Cuero.

District 9.—F. R. Black, Huntsville; Robert A. Neely, Bellville; John H. Wootters, Houston.

District 10.—Fred Colby, Beaumont; Tom Matlock, Port Arthur; T. A. Taylor, Lufkin.

District 11.—Roscoe O. Moore, Mineola; J. T. Boyd, Jacksonville; J. Weldon Birdwell, Tyler.

District 12.—H. R. Dudgeon, Sr., Waco; S. H. Burnett, Corsicana; Charles A. Garrett, Hillsboro.

District 13.—C. E. Adams, Abilene; R. L. Daily, Wichita Falls; E. E. Anthony, Fort Worth.

District 14.—John G. Young, Dallas; J. W. Atchison, Gainesville; Thomas E. Hunt, Jr., Paris.

District 15.—C. A. Smith, Texarkana; V. R. Hurst, Longview; Madison Ragland, Gilmer.

LOCAL COMMITTEES FOR ANNUAL SESSION

Members of the committees of Galveston County Medical Society which are making preparations for the annual session May 1-2 in Galveston of the State Medical Association have been announced by the chairman of the Committee on General Arrangements, Dr. Herman Weinert, Jr.

Assisting Dr. Weinert on the Committee on General Arrangements are Drs. Hamilton Ford, Clarence S. Sykes, George W. Beeler, Truman G. Blocker, and Edward Lefeber. The other committees are as follows:

LOCAL COMMITTEES

Housing.—E. S. McLarty, Chairman; W. J. Jinkins, Jr., Arild E. Hansen, Brooks Mullen, Martin Schneider, Edward R. Thompson.

Information.—Clarence F. Quinn, Chairman; Martin L. Towler, Robert Moore, Edgar F. Jones, Roy Reed, E. Hopkins Stirling.

Golf.—Edward Randall, Chairman; B. R. Parrish, Carroll T. Adriance, E. B. Ritchie.

Skeet Shoot.—Francis A. Garbade, Chairman; Titus H. Harris, G. W. N. Eggers, Jesse B. Johnson, Sr., Truman G. Blocker.

Clinical Luncheon.—Albert O. Singleton, Jr., Chairman;

John Middleton, John J. Delany, Marion S. McLellan, William T. Anderson, George S. McReynolds, Charles A. Hooks, Joe C. Rude.

Fraternity and Alumni.—John L. Otto, Chairman; John M. Thiel, William L. Marr, J. L. Jinkins, Jr., Robert M. Moore, G. R. Manske, Peter B. Kamin, Andrew Magliolo.

Women Physicians.—Gaynelle Robertson, Chairman; Virginia Blocker, Pattie M. Dodson, Lou Tomlinson, Caroline W. Rowe, Marthalyn Gainer.

Reception.—Dick Wall, Chairman; J. L. Jinkins, Sr., Charles T. Stone, Sr., William C. Fisher, Titus H. Harris, Robert E. Cone, William Starley, Willard R. Cooke, Jesse B. Johnson, Sr., H. Reid Robinson, William F. Spiller, Fred W. Aves, Robert M. Moore.

Scientific Exhibits.—Raymond L. Gregory, Chairman; Clarence S. Livingood, Charles R. Allen, George R. Herrmann, William T. Matlage.

Transportation.—Weldon W. Stephen, Chairman; Edward H. Schwab, Harvey C. Slocum, Norman D. Jarrell, Virgil Baxter.

Publicity.—M. L. Ross, Chairman; John McGivney, Weldon Kolb, William B. Potter.

Halls and Lanterns.—R. H. Rigdon, Chairman; A. W. Harrison, Charles T. Stone, Jr., E. E. Baird, N. D. Schofield.

Finance.—Emil Klatt, Chairman; Robert E. Casey, Paul Brindley, William C. Levin, Joe Magliolo.

Technical Exhibits.—A. J. Jinkins, Chairman; Paul B. de Mesquita, Arthur Ruskin, S. R. Snodgrass.

Memorial.—E. B. Ritchie, Chairman; T. M. Frank, W. B. Potter, Arthur Ruskin.

In connection with plans for the annual session, it should be pointed out again that the programs of the scientific sections will be closed after the mid-January meeting of the Council on Scientific Work, and members of the Association who wish to submit papers for consideration should do so immediately, writing directly to the appropriate section officers. A list of the officers appears in the June issue of the JOURNAL, page 462.

EXECUTIVE COUNCIL TO MEET

The midwinter meeting of the Executive Council of the State Medical Association will be held in Austin the weekend of January 27. As this JOURNAL went to press, plans for the meeting were incomplete, but it was expected that the Council would convene in the Stephen F. Austin Hotel. Members of the Council and others who should be in attendance at the meeting will receive further information by mail.

COUNTY SOCIETIES

Baylor-Knox-Haskell Counties Society

October, 1950

Diabetes—Ivan G. Mayfield, Lubbock.
Procurement and Assignment—Allen T. Stewart, Lubbock.

About twenty-five physicians of Baylor-Knox-Haskell Counties Medical Society and their wives met for dinner during October at Seymour to hear a talk on diabetes and a discussion of procurement and assignment of medical officers by two visitors from Lubbock. The program outlined above was presented.

Brazoria County Society

October 26, 1950

(Reported by W. T. Galloway, Secretary)

Plans for an essay contest on the subject "Why the Practice of Medicine in This Country Furnishes the Best Medical Care" were discussed by Brazoria County Medical Society, meeting for dinner October 26 at West Columbia. The society agreed to request the Woman's Auxiliary, members of which were present for the dinner, to sponsor the contest among high school students in Brazoria County. Prizes to be offered by the society were set at $25 first prize; $15 second; and $10 third.

Cass-Marion Counties Society

September 13, 1950

Raymond P. Hughes, Texarkana dermatologist, was guest speaker when Cass-Marion Counties Medical Society met September 13 in Atlanta. Twenty-eight physicians and their wives had a buffet supper together prior to the separate business meetings.

Galveston County Society

October 17, 1950

Academy of General Practice—C. F. Jorns, Houston.
Medical Society in Civilian Defense—Lt. Col. John Richards, Brooke Army Medical Center, San Antonio.

Two guest speakers appeared before Galveston County Medical Society at its October 17 meeting in Galveston. C. F. Jorns, Houston, president of the Academy of General Practice of Harris County, explained the aims and organization of the academy. Lt. Col. John Richards, director of the medical field service school at Brooke Army Medical Center, San Antonio, stressed the responsibility of the medical society in organizing for civilian defense.

A committee to nominate new officers was elected.

Hunt-Rockwall-Rains Counties Society

October 10, 1950

A dinner and musical program was enjoyed by members of the Hunt-Rockwall-Rains Counties Medical Society and Auxiliary at the home of Dr. and Mrs. J. W. Ward, Greenville, October 10. E. T. Crim, Joe Becton, and Mr. and Mrs. Don Course provided the music. Business meetings were held by both organizations after the social hour.

Jefferson County Society

October 9, 1950

Michael K. O'Heeron, Houston urologist, was guest speaker at the October 9 meeting in Port Arthur of Jefferson County Medical Society. A report of the procurement and assignment committee was made, and the society approved the screening program proposed by the tuberculosis association.

Tarrant County Society

October 17, 1950

(Reported by W. P. Higgins, Jr., Secretary)

Medical Aspects of Hyperthyroidism—Ross Whittenburg, Fort Worth.
Exophthalmos in Thyrotoxic and Thyrotrophic Hyperthyroidism—Harold Beasley, Fort Worth.

Tarrant County Medical Society had the program outlined above when it met October 17 in Fort Worth. Sixty-three members were present.

The society voted to have the president appoint a committee to work with the woman's auxiliary and also voted to send letters of thanks to the auxiliary and to cooperating firms for their assistance in the recent advertising program of the National Education Campaign of the American Medical Association.

Mal Rumph called attention to the failure of most members of the society to pay their American Medical Association dues and urged that they send in their dues right away.

An announcement of the availability of a speech clinic at Texas Christian University was made, and three new members were elected, two upon application and one upon transfer.

Taylor-Jones Counties Society

October 19, 1950

Tumor Clinic—Stanley L. Clayton and A. R. Onoff, Dallas.

Operation of a tumor clinic was demonstrated to members of the Taylor-Jones Counties Medical Society in Abilene on October 19 by two visitors from Dallas. Stanley L. Clayton and A. R. Onoff presented 6 patients with tumors for discussion at a joint meeting of the medical society and the Hendrick Memorial Hospital staff. Plans for starting such a clinic in Abilene are under way.

Travis County Society

October 17, 1950

(Reported by John F. Thomas, Secretary)

Publication of a mimeographed newsletter was authorized by Travis County Medical Society at its meeting in Austin, October 17. It was also decided that the society will hold four meetings a year devoted entirely to business matters and will reserve the other six meetings for scientific programs.

Henry Hilgartner, Austin, summarized the legal action which recently has been brought by the federal government against 3,000 ophthalmologists throughout the country. The diabetes detection drive to be held November 12-18 was discussed.

Victoria-Calhoun-Goliad Counties Society

October 26, 1950

Thirteen members and eleven guests were present for the Victoria-Calhoun-Goliad Medical Society meeting, October 26 in Victoria. Dudley Jackson, D. A. Todd, and Wilbur Robertson, all of San Antonio, were guest speakers. The society approved the educational program of the American Cancer Society and named a committee to review films on cancer for public showing in Victoria.

DISTRICT SOCIETIES

Fifteenth District Society

October 26, 1950

(Reported by Frank V. Mondrik, President)

MORNING

Welcome Address—Mr. Carroll L. Schiffer, Mayor of Texarkana.
Blast Injuries to Lungs—Cyrus P. Klein, Texarkana.
Carcinoma of Esophagus—Richard Brunazzi, Texarkana.
Clinical Approach to Management of Anemias—William C. Levin, Galveston.
Diagnosis and Treatment of Common Psychosomatic Disorders—Martin L. Towler, Galveston.
Texas Academy of General Practice—J. A. Hallmark, Fort Worth.
Business Meeting.

AFTERNOON

Difficulties in Differential Diagnosis of Hiatus Hernia and Coronary Artery Disease—John Griffin, Little Rock.
Prolonged Labor—John M. Sadler, Little Rock.
Indications and Contraindications for Cesarean Sections—Garth L. Jarvis, Galveston.
Treatment of Fractures of Forearm—William A. Ainsworth, Galveston.

The above program was given at the meeting of the Fifteenth District Medical Society in Texarkana on October 26. At a noonday luncheon the guest speaker was Mr. Tod Bates, Austin, Executive Secretary of the State Medical Association. Joe D. Nichols, Atlanta, councilor of the Fifteenth District, also gave a report at the luncheon.

New officers of the society are R. G. Granbery, Marshall, president; R. L. Johnson, Pittsburg, vice-president; and H. O. Padgett, Marshall, secretary-treasurer.

The district auxiliary met for luncheon and a tea at the home of Mrs. R. W. Pickett. Mrs. William M. Gambrell, Austin, President of the Woman's Auxiliary to the State Medical Association, spoke at the luncheon.

AUXILIARY SECTION

AUXILIARY NEWS

Bexar County Auxiliary

Bexar County Auxiliary and Medical Society held a western dance in San Antonio the evening of October 28 to honor the twenty-nine couples comprising new members of the organizations. Guests dressed in western clothes and danced to the music of a three-piece cowboy band.

Presidents and delegates of organizations in the City Federation of Women's Clubs were entertained by Bexar County Auxiliary on November 10 in San Antonio. Four San Antonio physicians, Drs. Asa Beach, S. W. Bohls, Albert Hartman, and Robert Nixon, presented a panel discussion on local tumor clinics. Mrs. Walter Walthall was chairman for the program, and Mesdames Fletcher Clark, Jr., John M. Smith, Jr., and Robert Sutton, Jr., were hostesses for the coffee hour. Mesdames John Pridgen and Frank Haggard, past presidents, served from a table arranged with autumn fruit and flowers.

Brazos-Robertson Counties Auxiliary

Brazos-Robertson Counties Auxiliary voted to purchase $25 worth of health education records for use in the local schools when it met October 19 in Bryan at the home of Mrs. T. T. Walton. In addition the organization decided to sponsor a nurse recruitment program in the spring and considered ideas submitted by Mrs. S. C. Richardson for an exhibit at the state meeting next May. Mrs. Dwight Andres read an article from *Today's Health* on burns in atomic warfare.

Mrs. John E. Talley, Waco, president of the Twelfth District Auxiliary, spoke briefly on the duties of the auxiliary. She was accompanied to Bryan by Mrs. F. F. Kirby, also of Waco.

Mrs. L. D. Stuart, president, presided over the business session, which was followed by a social hour with refreshments served by the hostesses, Mrs. T. T. Walton, Mrs. S. C. Richardson, and Mrs. T. O. Walton, Jr.—Mrs. J. W. Geppert.

Dallas County Auxiliary

A coffee honoring the president, Mrs. J. Shirley Hodges, and other officers of Dallas County Auxiliary was held October 4 in the home of Mrs. Leon Hodges, Dallas. This event was the first for the auxiliary this season.

Nine new members of Dallas County Auxiliary were entertained at tea October 27 in the home of Mrs. Frank

Officers of the Woman's Auxiliary to the State Medical Association of Texas: President, Mrs. William M. Gambrell, Austin; President-Elect, Mrs. O. W. Robinson, Paris; First Vice-President (Organization), Mrs. J. H. McCracken, Dallas; Second Vice-President (Physical Examinations), Mrs. Allen T. Stewart, Lubbock; Third Vice-President (Today's Health), Mrs. Joe T. Nichols, Atlanta; Fourth Vice-President (Program), Mrs. Carlos Hamilton, Houston; Recording Secretary, Mrs. E. W. Coyle, San Antonio; Treasurer, Mrs. John D. Gleckler, Denison; Corresponding Secretary, Mrs. William P. Morgan, Austin; Publicity Secretary, Mrs. R. T. Wilson, Austin; Parliamentarian, Mrs. Robert F. Thompson, El Paso.

Pearcy, Dallas. Mesdames J. Shirley Hodges, president, and Ridings E. Lee, president-elect, presided at the tea services.

The first regular luncheon meeting of the season was held by Dallas County Auxiliary in Dallas on November 1 with 170 members in attendance. Dr. Elliott Mendenhall, president of Dallas County Medical Society, spoke on "State Hospitals." He was introduced by Mrs. C. O. Patterson, program chairman.—Mrs. Charles D. Bussey, Publicity Chairman.

Donley-Childress-Collingsworth-Hall Counties Auxiliary

Donley-Childress-Collingsworth-Hall Counties Auxiliary held a business session October 19 in the home of Mrs. J. A. Odom, Memphis, following a dinner with the medical society. Plans were made for a Doctor's Day celebration November 14 for which each doctor was to be presented with a red carnation. Mesdames R. E. Clark, Memphis; C. B. Jones, Wellington; and J. H. Jernigan, Childress, were named public relations chairmen. After adjournment of the business meeting by the president, Mrs. E. K. Jones, Wellington, games were enjoyed by the membership.—Mrs. E. W. Jones, Secretary.

Galveston County Auxiliary

Galveston County Auxiliary celebrated its thirtieth anniversary at a luncheon October 10 in Galveston with charter members and past presidents as special guests. Mrs. William M. Gambrell, Austin, President of the State Auxiliary, spoke to the group about auxiliary projects and discussed plans for the state meeting to be held in Galveston next May. Mrs. M. L. Graves, Houston, charter member of the Galveston auxiliary; Mrs. F. J. L. Blasingame, Wharton, council woman of the Eighth District; and Dr. Herman Weinert, Jr., president of Galveston County Medical Society, were guests. Mrs. Jesse B. Johnson was chairman and Mrs. W. F. Spiller co-chairman of arrangements.

Gonzales County Auxiliary

Dr. and Mrs. David Shelby entertained Gonzales County Medical Society and Auxiliary at dinner in their home in Gonzales recently. In a business meeting afterward, auxiliary members discussed placing *Today's Health* in the reception rooms of offices of professional people. They also went on record in opposition to socialized medicine and made plans to encourage other organizations to do the same.

Grayson County Auxiliary

Grayson County Auxiliary held its first meeting of the year October 13 in Denison with eight new members as guests of honor. Mrs. F. M. Sporer, Van Alstyne, president, entertained with a coffee, and Mrs. John Gleckler, Denison, treasurer for the State Auxiliary, and Mrs. W. A. Lee, Dallas, president-elect of the Fourteenth District Auxiliary, presided at the coffee service. The house party also included members of the executive board.

Mrs. William M. Gambrell, Austin, President of the Woman's Auxiliary to the State Medical Association, spoke at an open meeting of Grayson County Auxiliary in Sherman on November 9. After Mrs. Gambrell's talk, a tea entertained the guests.

Harris County Auxiliary

A tea given by officers of Harris County Auxiliary to honor new members, traditional since 1927, was held at the residence of Mrs. James Greenwood, Jr., Houston, on October 30. Hostesses included Mesdames Guy E. Knolle, John T. Stough, Truitt Melton, N. A. Kilgore, Dolph Curb, R. C. L. Robertson, Lynn Zarr, Keith Bradford, and I. L. Pawelek.

A joint meeting of the Harris County Auxiliary and the South Texas District Auxiliary was held November 20 in Houston, with visitors for the Post Graduate Medical Assembly of South Texas as guests. Mrs. William M. Gambrell, Austin, President of the Woman's Auxiliary to the State Medical Association, was the speaker at the luncheon, for which Mrs. Paul W. Best was chairman.—Mrs. Lynn Zarr, Publicity Secretary.

Hopkins-Franklin Counties Auxiliary

Hopkins-Franklin Counties Auxiliary met for a business and social hour in the home of Mrs. Henry Stinson, Mount Vernon, on October 4. Mrs. Henry Stanford, Mount Vernon, president, presided over the program, which consisted of reading of the constitution and by-laws of the Woman's Auxiliary to the American Medical Association and a message from the president of that group. Mrs. Stanford's 10 year old son entertained with a piano selection.

Jefferson County Auxiliary

Marjorie Shearon, Ph. D., of Chevy Chase, Md., spoke of the Congressional battles over socialized medicine at a luncheon of Jefferson County Auxiliary in Port Arthur on October 4. New members of the auxiliary were honored at this first meeting of the season for which Mesdames Frank J. Beyt, Paul Meyers, Thomas Matlock, I. T. Young, and Robert Browne were hostesses. About fifty members were present. Dr. Shearon was introduced by Mrs. Rex Fortenberry, Beaumont.—Mrs. G. R. Solis.

Kerr-Kendall-Gillespie-Bandera Counties Auxiliary

Kerr-Kendall-Gillespie-Bandera Counties Auxiliary observed Presidents' Day when it met October 6 at the home of Mrs. Sam Thompson, Kerrville. Mrs. Dor Brown, Fredericksburg, president of the county auxiliary, and Mrs. William M. Gambrell, Austin, President of the State Auxiliary, were the honorees. Mrs. Gambrell spoke to about forty members on the aims and objectives of the auxiliary. Mrs. C. C. Jones, Comfort, served cake and Mrs. Victor Keidel, Fredericksburg, presided at the coffee service.

McLennan County Auxiliary

"Legislation for Women" was the subject John B. McNamara, Waco attorney, discussed for McLennan County Auxiliary at a morning coffee October 25 in Waco. After the talk, which explained state laws pertaining to women, auxiliary members toured the new YWCA building in which they met. Hostesses included Mesdames Aubrey Goodman, Carl Friedman, William Roddy, D. D. Warren, J. M. Garrett, J. L. Burgess, C. H. Reese, and Shelby Spencer, Waco, and S. L. Witcher, Clifton.—Mrs. C. F. Miller, Corresponding Secretary.

Reeves-Ward-Winkler-Loving-Culberson-Hudspeth Counties Auxiliary

Reeves-Ward-Winkler-Loving-Culberson-Hudspeth Counties Medical Society and Auxiliary met October 19 at Kermit for dinner, after which each held separate meetings. The Auxiliary heard Mrs. Joseph Best, Wink, who visited in England during the summer, discuss living conditions and socialized medicine there. One guest and fifteen members were present. Hostesses were Mesdames B. A. Wight, W. H. McClure, Joe D. Heath, and David Sauer.—Mrs. Rufus A. Roberts, Publicity Secretary.

Victoria-Calhoun-Goliad Counties Auxiliary

Victoria-Calhoun-Goliad Counties Auxiliary heard Dr. Andrew S. Tomb, Victoria, discuss the campaign of the physicians against socialism at its luncheon meeting October 4 in Victoria.

Washington County Auxiliary

Doctor's Day was celebrated by Washington County

Auxiliary at a dinner October 30 in Brenham at which thirty-one members and guests were present. The committee which planned the dinner to honor physicians of the county was headed by Mrs. Waldo Knolle with Mesdames C. E. Southern, W. F. Hasskarl, Sr., Milton Routt, and C. W. Schoenvogel assisting.

AUXILIARY DEATHS

Mrs. O. N. Mayo, Brownwood, died in a local hospital November 16, 1950. She was formerly a member, past president, and past secretary of the Woman's Auxiliary to the Brown-Comanche-Mills-San Saba Counties Medical Society. Mrs. Mayo had been active in the First Christian Church of Brownwood, at one time serving as director of young people's activities. She was also a member of the Order of the Eastern Star.

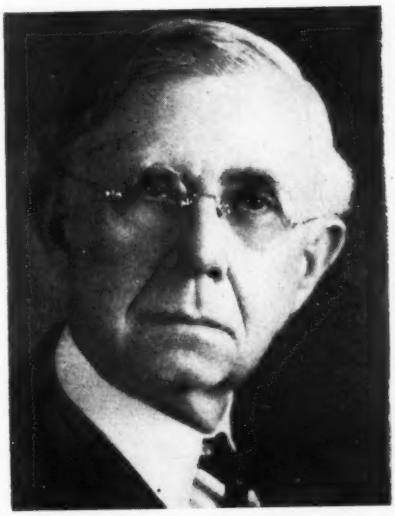
Mrs. Mayo is survived by her husband, Dr. Mayo; four daughters, Mrs. E. B. Grady, Amarillo; Mrs. J. E. Bohannon, Waskom; Mrs. George Roland, Brownwood; and Mrs. Emil Stuter, Fort Worth; a half-brother, R. G. Anderson, Brownwood; a half-sister, Mrs. Everett Selby, Davis, Okla.; eight grandchildren; and one great-grandchild.

DEATHS

D. M. CHILDERS

Dr. David Marion Childers, Lufkin, died in a Houston hospital October 3, 1950, from congestive heart failure.

Born in Jasper on June 8, 1867, Dr. Childers was the son of Marion and Irene Childers. He received his early education in the Jasper public school. In 1892 he was graduated from the Kentucky School of Medicine, Louisville. Beginning his medical career in Laurel, Texas, where he remained for five years, Dr. Childers was located in Burkeville for four years and Kirbyville for five years before moving to Lufkin, where he practiced for forty-eight years. He specialized in children's diseases and attended postgraduate courses in pediatrics each year at the University of Texas Medical Branch, Galveston, having gone last fall at the age of 82.



DR. DAVID M. CHILDERS

Dr. Childers was for many years a member of the State Medical Association and the American Medical Association through Angelina County Medical Society. He was named to honorary membership in the State Medical Association in 1949. He was also a member of the Southern Medical Association, the Texas Pediatric Society, and the Fifty Year Club. Dr. Childers was a lifetime member of the board of stewards of the First Methodist Church and a member of the Lions Club and Woodmen of the World. Before his death he had requested that money which might be spent for flowers instead be donated to the Methodist Memorial Fund.

In June, 1892, at Jasper, Dr. Childers married Miss Tillie Harris, who died January 9, 1949. Surviving are two sons, Dr. M. A. Childers, Harlingen, and K. P. Childers, Crowley, La.; three daughters, Mrs. Vernon Glenn, Lufkin; Mrs. Esther Strickland, Oklahoma City; and Mrs. O. B. Crofford, Memphis, Tenn.; one brother, J. R. Childers, Jasper; six grandchildren; and four great-grandchildren.

S. W. KELLAM

Dr. Seth W. Kellam, Dallas, Texas, died September 10, 1950, in a Dallas hospital.

Born April 13, 1906, in Dallas, Dr. Kellam was the son of the Rev. and Mrs. James J. Kellam. He acquired his academic education at the University of Oklahoma, Norman, and Baylor University, Waco; in 1936 he received a medical degree from Baylor University College of Medicine, Dallas. Serving an internship at Tacoma General Hospital, Tacoma, Wash., from 1936 to 1937, and at Bradford Memorial Hospital for Children, Dallas, he then was on active duty for eight months in 1937-1938 with the Civilian Conservation Corps. He began his medical practice in 1938, in Menard, Texas, where he practiced for four years, then entered the United States Public Health Service for one year, being located in Mineral Wells. From 1943 to 1946 Dr. Kellam served as a first lieutenant in the United States Army Medical Corps and was stationed at Brooke General Hospital, San Antonio. After his discharge he practiced in San Antonio and Dallas until his death.

Dr. Kellam was a member of the State Medical Association and the American Medical Association through Kimble-Mason-Menard, Bexar, Ector-Midland-Martin-Howard-Andrews-Glasscock, and Dallas County Medical Societies successively.

Surviving Dr. Kellam are his wife; his parents, the Rev. and Mrs. James J. Kellam, Dallas; and a brother, Jack Kellam, Cleburne.

W. D. LIGHTFOOT

Dr. Wooten Dudley Lightfoot, Beaumont, Texas, died at his home September 20, 1950.

Born October 2, 1890, in Paris, Texas, Dr. Lightfoot was the son of Judge and Mrs. Henry Lightfoot. He was awarded a bachelor of arts degree from the University of Texas, Aus-

An obituary ordinarily will not be published more than four months after date of death. Cooperation in reporting deaths of physicians and in furnishing appropriate biographical material promptly is solicited.

tin, in 1911 and a degree from the University of Texas School of Medicine, Galveston, in 1915. In 1919 he took postgraduate work in diseases of the eye, ear, nose, and throat in New York. After his graduation from medical school, Dr. Lightfoot was a ward surgeon at the Austin State Hospital. He was oculist for the Texas School for the Deaf and the Texas State School for the Blind, Austin. Dr. Lightfoot was in private practice in California, New York, and Wisconsin from 1920 until 1925, when he became affiliated with the Veterans Administration. In 1943 he resigned from

DR. WOOTEN D. LIGHTFOOT

the Veterans Administration and resumed his private practice in Beaumont, where he practiced until forced by illness to retire.

Dr. Lightfoot was a member of the American Medical Association and the State Medical Association through Travis County and Jefferson County Medical Societies. He was a member of the Methodist Church and the Masonic Lodge. His family requested that no flowers be sent to the funeral but that friends wishing to pay tribute to him make a donation to the Municipal Hospital, Beaumont, in his memory.

Survivors are his wife; two sons, Dudley Lightfoot, Beaumont, and Henry Lightfoot, Hollywood, Calif.; a brother, Will H. Lightfoot, Paris; a half-sister, Miss Sallie Lee Lightfoot, Paris; and a grandchild.

B. F. RHODES

Dr. Benjamin Franklin Rhodes, Abilene, Texas, died from a heart attack in a local hospital August 19, 1950.

Dr. Rhodes was born October 28, 1874, in Mansfield, the son of Isac D. and Mary Ann Rhodes. Receiving his early education in the public schools of Stephens County, he was graduated in 1908 from the University of Texas School of Medicine, Galveston. Before he was graduated from medical school he had practiced for five years in Eolian; immediately thereafter he practiced for twelve years in Breckenridge. He then moved to Abilene, practicing there for thirty years.

Dr. Rhodes had been a member of the State Medical Association and the American Medical Association continuously since 1904 through Stephens-Shackelford and Taylor-Jones Counties Medical Societies. He was secretary in 1934 of Taylor County and president in 1936 of Taylor-Jones Counties Medical Societies and was elected an honorary member of the State Medical Association in 1947. During World War I he served in the Army Medical Corps. In 1943 and 1944 Dr. Rhodes was chief of staff of Hendrick Memorial Hospital. He was an elder in the Presbyterian Church and clerk of its session, and for many years he taught Sunday school. He was a Mason, a Woodman of the World, and an Odd Fellow.

Dr. Rhodes married Miss Florence T. Swindell in Eolian in 1907. She survives as do four sons, W. P. Rhodes and B. F. Rhodes, Jr., Abilene; David Rhodes, Dallas, and Tom Rhodes, Victoria; a daughter, Mrs. J. A. McCollum, San Angelo; and a brother, I. David Rhodes, Big Spring.

H. E. ROGERS

Dr. Hugh Earl Rogers, El Paso, Texas, died in a Waco hospital September 27, 1950, from gangrene and arteriosclerosis of the right foot and leg.

Born August 31, 1891, in Milford, Dr. Rogers was the son of Dr. Hugh Earl and Sarah Emma Rogers and the brother of Dr. Will Rogers, El Paso. He received a bachelor of arts degree in 1913 from Texas Christian University, Fort Worth, and was graduated in 1917 from the University of Texas School of Medicine, Galveston; he taught chemistry at both schools. Dr. Rogers served an internship at the City Infirmary Hospital, St. Louis, in 1917 and 1918; later he was a resident in urology at the New York Hospital, New York. During the first World War he was a captain in the U. S. Army Medical Corps. He practiced for eight years in

DR. HUGH EARL ROGERS

New York. Dr. Rogers was superintendent of the El Paso General Hospital, El Paso, and for twenty-five years practiced in that city, specializing in urology.

Dr. Rogers was a member of the State Medical Association and the American Medical Association through El Paso County Medical Society. A diplomate of the American Board of Dermatology and Syphilology, he was also a member of the American Urological Association and a fellow of the American College of Surgeons.

On October 25, 1933, in El Paso, Dr. Rogers married Miss Marion Barbree, who survives. Also surviving are two sons, Joseph Rogers and William Rogers, and a daughter, Dorothy Rogers, El Paso; a brother, Dr. Will Rogers, El Paso; and two sisters, Mrs. Stella Rutherford and Mrs. May Cornahan, San Diego.

obar pneumonia with bacteremia

fter initiation of Chloromycetin therapy the temperature returned
o normal within forty-eight hours, and prompt subsidence of the
ough and chest pain occurred."[1]

ronchopneumonia

linically, the child improved rapidly and was out of the oxygen
nt in 24 hours and afebrile in 36 hours."[2]

rimary atypical (virus) pneumonia

n the first evening of Chloromycetin treatment the subjective symptoms
ere less severe, and within 24 hours his fever began to settle."[3]

hloromycetin is effective against practically all pneumonia-
ausing organisms. Response is strikingly rapid, temperature drops,
he lungs clear... and your patient is convalescent.

hloromycetin is unusually well tolerated. Side effects
re rare, severe reactions almost unknown.

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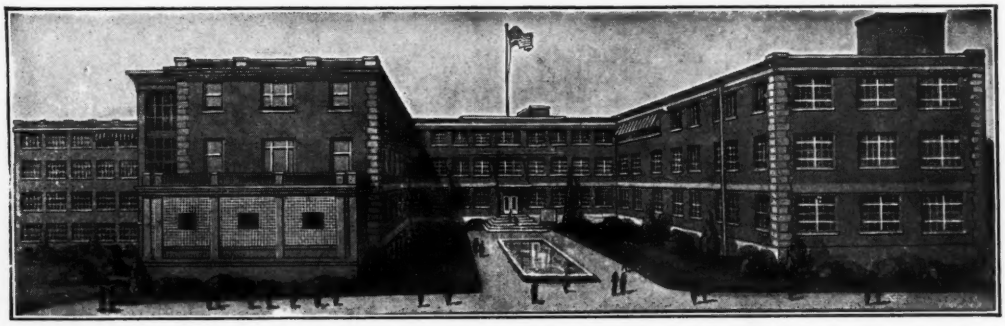

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